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Designed to suggest solutions to problems of curricula and instructional techniques for physically disabled children, the text considers the nature of the child and discusses these aspects of curriculum and methods: definitions and objectives; teachers and administrators; time requirements and enrichment; grouping; reading instruction; testing, homework, and teacher's aides; automation; and classroom procedures. The following are also discussed: preschool education; language arts, art, music, physical education, math, and science in kindergarten; primary grades; language arts, math, social studies, and science in upper elementary grades; English, social studies, math, science, business education, and art, photography, puppetry, music, library, physical education, health, home economics, and guidance in secondary education; and extra-curricular activities including field trips and driver education. A summary and implications for future curricular changes are presented. (RJ)

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HUMAN RESOURCES STUDY NUMBER 12

The Modification of Educational Equipment and Curriculum for Maximum Utilization by Physically Disabled Persons

Curriculum and Instructional Techniques for Physically Disabled Students

Samuel P. Nemarich
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1969

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*3. Cambell, W. J., Leizer, R. R., & Yuker, H. E. A study of the adaptability of disabled workers, 1958.

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6. Yuker, H. E., Block, J. R., & Campbell, W. J. Disability types and behavior, 1962.

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The Modification of Educational Equipment and Curriculum for Maximum Utilization by Physically Disabled Persons

Grant #2644

Curriculum and Instructional Techniques for Physically Disabled Students

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1969

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HUMAN RESOURCES CENTER
ALBERTSON, NEW YORK 11507

FOREWORD

This present series of monographs represents a significant departure in the publications of the Human Resources Center. Up to this point the Center's monographs have been descriptive and attitudinal studies concerning the disabled worker. In contrast to these, the present series of five monographs are reports relating to the education of severely physically disabled children.

Although these reports have a wide perspective they focus on Human Resources School. This school has been one of our most successful experiments. We feel that it is important to provide others with information about the school, as well as information about other major successful attempts at educating physically disabled children. This series of monographs attempts to integrate the available information in this area.

The United States today is placing more emphasis upon better education for all. With this emphasis, the education of the severely disabled child, formerly considered homebound, has become increasingly significant. It is our hope that the information contained in this series will contribute substantially to the improvement of the quality of educatio[illegible] to disabled children throughout the United States and the world so th[illegible]e independent and productive citizens.

Henry Viscardi, Jr., LL.D., L. H. D.
President
Human Resources Center

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PREFACE

The purpose of this series is to provide a comprehensive source of information pertinent to the education of physically disabled, intellectually normal children. The information presented should help to provide the educators of these children with a program to increase the effectiveness of their teaching. A secondary purpose is to stimulate educators to attempt to formulate their own solutions to the problems investigated.

These publications are designed to fill a need for information about the education of physically disabled children. The need for information has been expressed by everyone involved, from the school superintendent and the local school board to the classroom teacher and the physical and occupational therapists. The information explosion has not yet reached into this practical area. Many ingenious theories have been suggested, but solutions to actual problems have not been publicized. If problems in educating the disabled child are being met successfully, their methods are not widely communicated. Ultimately the regional curriculum centers in special education will provide this information.

These publications are designed to serve as a preliminary, concise handbook of information about the education of physically disabled children. They present information about a wide variety of topics of interest to special educators. The material has been obtained from a number of sources. Much of it comes from a relatively extensive review of the literature. Over 800 books, articles, pamphlets, etc. were reviewed. Some information came from interviews with leading educators in various parts of the country. Others, whom we were unable to visit, made their contributions in writing.

The series of reports has been organized into five topics, each dealing with a major aspect of the education of disabled children. The discussion of each topic includes a general introduction, a series of problem areas each with a solution or solutions, a summary, and a list of references. The problems covered are generally those of greatest concern in the field, the ones most apt to arise when two persons concerned with the education of physically disabled children get together.

The solution that is given is based on information obtained from the sources described above. It represents our interpretation of current ideas in the field. In some cases, when more than one solution is discussed, it may indicate either that there is disagreement among the experts, or that the authors disagree with the experts.

The bibliography at the end of each monograph is in some respects the most important part of the series. It lists the primary sources that provide the important details that were omitted from the present publications.

CONTENTS

Foreword iii

Acknowledgements iv

Preface v

Introduction xi

The Nature of the Child and the Educational Problem 1

General Aspects of Curriculum and Instructional Techniques . . 4

- Definitions and Objectives 4
- Teachers and Administrators 4
- Time Requirements and Patterns of Enrichment 5
- Grouping 6
- Reading Instruction 8
- Testing, Homework and the Teacher Aide 10
- Automation 12
- Classroom Procedures 14

Elementary Education 16

- Introduction 16
- Pre-School 16
- Kindergarten 20
  - Language arts 21
  - Art 21
  - Music 21

Physical education 22

Mathematics 22

Science 22

Primary Grades 22

Upper Elementary Grades 23

Language arts 24

Mathematics 24

Social studies 24

Elementary science 25

Secondary Education 26

Introduction 26

English 26

Social Studies 27

Mathematics 28

Science 30

Business Education 32

Special Subjects 38

Art Curriculum 38

College 38

Design and commercial 38

Art history and appreciation 39

Fine arts 40

Photography 41

Puppetry 42

Music 43

Library 44

Physical Education 47

Health Education 51

Home Economics and Activities for Daily Living 52

Guidance 53

Extra-Curricular Activities 56

Field Trips 57

Driver Education. 57

Summary and Implications for Future Curricular Changes. . . . 62

References. 67

Appendix. 72

INTRODUCTION

Education for human variability has been a topic of constant concern in the history of contemporary education. Teachers and administrators engaged in educating the physically disabled have a particular interest in progress in this area. They are forced to focus on the problems more sharply than educators whose students are able to accommodate to curricula and instructional techniques less attuned to individual requirements.

The curriculum needs and classroom approaches to learning for the physically disabled child are highly specific, as they are, in fact, for all children. A primary concern, however, is with the child's disability, his lessened ability to accommodate. This concern provides the incentive for curricular adjustment and the modification of instructional technique. Experience indicates that such sensitivity to special needs has implications for the teaching of the normal child as well. Thus, hopefully, the contribution of this monograph shall be doubly valuable.

Teachers and administrators of schools for the physically disabled are aware that solutions to many problems of educating the physically disabled have already been suggested. However, there is a paucity of literature delineating the specific manner in which some major problems have been solved.

This monograph will suggest solutions to problems of curricula and instructional technique for the physically disabled child which have been found successful, and it will attempt to direct attention to further problems in need of investigation. There will be an attempt to indicate transition from less successful patterns to those which have been more effective. Discussion will focus upon solutions to the educational problems of the physically disabled child currently employed at Human Resources School and other schools similarly oriented, and will suggest what objectives may be reasonably attainable in the near future.

This monograph is written by practitioners and not theoreticians. Its authors agree with the view of Fred T. Wilhelms, the new Executive Secretary of the Association of Supervision and Curriculum Development, that publications about educational programs will have to shift "from abstractions about ideal things to dealing with the process of what is actually going on." (Wilhelms, 1968).

THE NATURE OF THE CHILD AND THE EDUCATIONAL PROBLEM

In order to determine the kind of curriculum to offer disabled children, it is important to know just what these children are capable of accomplishing and to become aware of the factors which influence their emotional and social adjustments.

In citing intellectual and emotional characteristics it is important to remember that we are dealing with a small group, a factor which makes it difficult to set up separate test norms. However, much progress has been made in the past two or three decades in the study of the capabilities and needs of children with physical limitations. Most boys and girls differ widely in traits of character and intellectual potential, and require special consideration to develop their full potentialities; disabled children require even greater understanding. In general, however, they have the same problems and needs as able-bodied children.

In evaluating the intellectual and academic levels of disabled children, achievement tests, such as the Iowa and Metropolitan Achievement, and Intelligence tests, such as the Stanford-Binet and the Wechsler Intelligence Scale for Children, prove most effective if used with discretion. When tests are given in groups, provisions must be made for students who have special physical difficulties, such as writing. When time limits are not adhered to and the test is given as a power test only, this should be noted in the child's record and national norms should not be used. Such norms are not important if the purpose of the tests is to furnish information in order to give guidance based on the individual's potential. National norms do become important if the child comes under consideration for placement in a regular school program, and when the time comes for vocation or college planning.

Tests reported by Connor indicate that the intelligence of children in classes for the orthopedically disabled, excluding brain damaged children, did not differ essentially from the total school population (Connor, 1967). These findings have been substantiated by those made in other areas. There were, however, until 1962, no standardized findings on a group of children which had been homebound. In the course of setting up a school for physically disabled children, Human Resources in Albertson, New York, conducted such a series of tests on 30 disabled children. It was found that these children, for the most part, did show severe academic limitations. They were several grade levels below their normal peers, exhibiting a variety of highs and lows in subject achievement scores. This seemed to be the result of confinement to a circumscribed physical and social world, as well as limited academic instruction (Human Resources School, 1962-1968).

In the field of emotional and social adjustment, early studies tended to indicate that physically disabled girls exhibited more neurotic symptoms than boys. This could be partly explained by the fact that the boys seemed able to find more satisfactory vocational adjustments than the girls, and were less concerned with physical appearance and social factors. Recent findings from tests made within the last 12 years have been summarized by Kirk, using test results from Cruickshank, Kammerer and others (Kirk, 1962). From these tests it can be seen that this group of children, as a whole, shows a greater tendency toward a more personalized, introspective view of life than able-bodied children. They experience difficulty in facing social situations generally, especially situations which may imply guilt or personal inadequacy. They show concern over their health and their disability. However, there is no evidence that a crippling condition produces a disordered personality. Where personality disturbances occur they indicate that the crippled child has confronted severe problems. Parental attitudes toward crippled children, either rejecting or protecting them, tend to be more extreme than toward normal children, and have a great deal to do with the ultimate life adjustment of the child (Kirk, 1962).

Types of maladjustments are similar to those found among the non-disabled, such as withdrawal behavior, timidity, and self-consciousness, but to a slightly greater degree. There is no evidence of a relationship between kinds of physical disabilities and kinds of maladjustment (Kirk, 1962). Kirk also states that the physically disabled younger child will have a greater amount of maladjustment than the person who becomes disabled during adolescence, because by that time his personality is well formed (Kirk, 1962). Observations made by professional personnel at the Human Resources School tend to disagree with this statement.

Nevertheless, if physically disabled children are handled with wisdom by teachers and parents, if they are helped to establish realistic goals for accomplishment, if they are recognized as worthwhile individuals for whatever positive qualities they possess, if they are given healthy concepts about their disabilities and a feeling of independence in spite of physical dependency, they can and will develop into mature and well-adjusted individuals.

The question inevitably arises whether it is better to educate disabled children in special schools or with their able-bodied peers.

Tests have established that orthopedically disabled children in regular classes are chosen fewer times as playmates, friends and workmates than other children, and for this reason experience greater frustration than in special classes (Kirk, 1962). Disabled children are sometimes housed in a special resource room of a regular school. This arrangement often perpetuates the social isolation which it seeks to eliminate.

It appears necessary that children with severe types of physical disability or health problems be educated in schools built to house them and staffed by personnel trained in special educational methods. In determining whether a disabled student should be placed in a special or regular school situation, the critical elements to be considered are his personality and capabilities. All disabled children belong in schools, and the professional personnel involved in their welfare must assume the final responsibility for placement. In every case this placement must encourage the optimum development of the intellectual, social, and emotional capabilities of the individual child.

Though it may seem paradoxical, a serious factor in adapting or modifying curricula for the physically disabled child is the necessity of avoiding over-adapting. In his eagerness to accept an education the motivated disabled student is often able to accommodate remarkably to curricular and instructional requirements. The ability to adapt, must be developed. Unnecessary adaptations serve only to make the physically disabled child more dependent upon the outer world.

McCavitt and others have cited the tendency to over-protect physically disabled children and the subsequent problems of emotional instability and dependency (McCavitt, 1966). Admittedly, the development of these human resources on a personal level for each physically disabled child is a most difficult task. Teachers, administrators, and students must be made aware of the needs to be served by curriculum. Implementation is the task of the teacher. Balance is the keyword. The question which must constantly be kept in mind is, "How far may we go without exceeding ability or strength and promoting undue frustration?" The art of the teacher is heavily relied upon at this juncture of curriculum implementation.

GENERAL ASPECTS OF CURRICULUM AND INSTRUCTIONAL TECHNIQUES

A. Definitions and Objectives. Teaching or instructional technique shall be defined as those activities which are carried on within the auspices of the school program. This shall include activities within and outside of the classroom. Curriculum shall be defined as those formal and informally organized areas of knowledge and activities which the student engages in due to his association with the school. These definitions are purposely broad and non-restrictive. They reflect the increasingly dominant role of the school upon the educational and social life of the student.

We shall try to maintain the duality of curriculum and methodology. At some points the methods of instruction and curriculum content are inextricably woven together and each compliments the other. In these instances the duality fuses, and the process of education within the living environment of the classroom is presented as an integrated pattern.

Taylor (1966) presents a particularly comprehensive program of goals for special education, but for some physically disabled children education may be pursued as an end in itself. It is sometimes difficult to think in terms of conventional goals when administrators, teachers, and parents realize that the child before them will live his entire life span in the school-home community.

B. Teachers and Administrators. From the outset it must be recognized that the teacher, in addition to being responsible for instructional technique, is also the final arbiter or modifier of curricula. The teacher is the ultimate fashioner of existing curricula, and with time and experience may begin to initiate changes so drastic that he is actually the designer of newer and more efficient curricular approaches. Thus, it is wise to encourage instructional experimentation for the sake of progress.

The administrator may reinforce this tendency to improve curricula (Jenkins & Blackman, 1956). The most effective administrators studied had some facility to help teachers define jobs and were able to encourage teachers as they progressed in their efforts to develop or modify curriculum. There was no significant relationship between verbalization and effectiveness of administrators. For those who pioneer into relatively new fields, such as education of the physically disabled, the acceptance of their improvisation to meet specific educational needs is necessary.

Professionals in this field (Wilson, Cruickshank, Kirk) contend that the curricular offerings for the normal child are suitable for the physically disabled. Human Resources School relies heavily upon existing state syllabi as the source of curricula materials. General modifications of such curricula which have been found useful in meeting the special needs of disabled students are discussed below.

C. Time Requirements and Enrichment. The conventional blocks of time utilized in schools for normal children, and total cumulative time allowed in such schools for mastery of some specific content area, cannot always be respected as guides for educating the physically disabled child. If the child is slower, because of his physical disability, many days are lost throughout the school year, and some adjustments must be made to insure learning. Loss of school time is one of the major educational problems at Human Resources School. At Human Resources School, adjustment to these difficulties has been accomplished by recognizing the problem initially, and providing flexibility of scheduling. Students and teachers may schedule extra periods of time to work with particular course content, such as algebra, if it becomes obvious as the school year unfolds that class progress is not sufficient to complete a course by the end of the school year. Extra sessions (full periods of instruction) may be scheduled so that students receive up to 100% more than the usually allotted time for completion of a given course.

In some instances special needs of students may be anticipated. In these cases, additional class time may be assigned at the beginning of the school year. Flexibility of scheduling on the part of administration and teachers is required in order to make this kind of program effective.

Wirtz alludes to this problem and concludes that although initial cost may be high, the final savings, considering only the economics of the situation, are great (Wirtz, 1965).

There are other patterns of adjustment to accommodate to the student's needs for time, such as increasing the length of the school year (Allen, 1968). Human Resources School initiated such a program along with other school districts in New York State in August 1968.

Another pattern which has been proposed for future study and possible implementation is that of providing a fifth year of secondary education. The suggestion would provide for a deviation from the academic syllabus following the 11th year. The school should reorder and re-establish some of the disabled child's loss of sensory experience (Riessman, 1962). His social and intellectual world is restricted by his degree of mobility. Television has improved the situation but cannot substitute for firsthand experience (Dubos, 1967). It would be advisable to broaden the base of experience for such children who are in a real sense culturally deprived. A year of exploration of the world of work, for example, or the opportunity to experience the natural history and artistic wealth of the world through group travel, would erase some of this deprivation.

When absences are excessive and when curriculum requirements are rather fixed, attempts at expanding and enriching the four year curriculum may conflict with the development of required skills, concepts and attitudes, and cause a frustrating choice to be made between actual enrichment and basic education. But time must be found for enrichment even if it does involve some sacrifice of "scholarship," as measured by end of year examinations. Some 16 year old residents of Long Island have never seen a beach. In this case, the mere act of providing physical transportation is essential to the development of certain concepts. The Human Resources School schedules more than the usual number of field trips and also brings to the school concerts, exhibits, and many individual artists, statesmen, and scientists.

D. Grouping. The problem of grouping creates many difficulties. Economics must be considered since the proper grouping of physically disabled children for instructional purposes may require pupil-teacher ratios that are lower than usually accepted.

Human Resources School registers new students throughout the school year whenever it is possible to process an application and obtain transportation. The staff has operated a completely flexible program in order to accommodate a constant influx of new students. The school, which started out with multigrading similar to that used in other special schools or special classes for handicapped children, has gradually worked toward the goal of traditionally graded classrooms while maintaining a curriculum flexible enough to enable each child to work at his own speed. This goal has been considered desirable in order to supply the social contacts within chronological age groupings which these children so desperately need. All grade levels are flexible and employ multilevel instruction.

A pupil-teacher ratio of ten to one is considered feasible. The pre-school program employs two teachers for eight children, who work with two groups a day for two hour periods. Special teachers on the elementary level include those needed for remedial reading, library, physical education, art, music and science. The first criterion for grouping on the high school level is student choice of electives. Where course offerings are required subjects, other criteria for grouping must be applied. One pattern which has been applied is classification by reading level. Many workers have noted that the interrupted pattern of education of the physically disabled child has resulted in the specific need for remedial reading instruction (Lawrence, 1962). Students organized along this line of special need may best be served in terms of remedial instruction and modified curricula in science, social studies and English. Such grouping makes feasible a greater degree of horizontal integration. Course areas are brought together through the cooperative efforts of teachers, such as team planning of units of study. For example, the English teacher and science instructor may collaborate upon reading skills, vocabulary, spelling, written expression, and other study skills common to both disciplines.

One pattern of organization which should be avoided is that of multilevel grouping. This has been adopted by many schools and was for a time employed by Human Resources School during its embryonic stage of development. This plan does not offer an effective or adequate pattern of education for the physically disabled child and should be eliminated by a school as soon as it is possible. Placing two or more such groups within the sphere of one classroom dilutes the amount and quality of instruction for each child. The old "one room schoolhouse" pattern of education may suffice for some pupil populations, but does not seem feasible for the physically disabled child who is determined to obtain a meaningful and creditable elementary and secondary education.

At Human Resources School while the low-pupil-teacher ratio has many recognized advantages, there are some subtle or perhaps less obvious benefits to the student which should be indicated. Small classes and low school population (under 250) lead administrators and teachers to search for special scheduling and curricular processes when the application of traditional approaches is difficult. For example, traditional block scheduling is not as easily implemented on the secondary level with a low student population. The luxury of hiring teachers who are specialists, and not competent in their sister disciplines, must be relinquished. Teachers at Human Resources School must have broad bases of education which allow them to teach more than one special area. For example, these are some of the instructional combinations assigned to some teachers:

English - Social Studies; Social Studies - Mathematics;
Chemistry - Biology - Mathematics; General Science - Mathematics;
Library - Curriculum Consultant - Research - Guidance.

Admittedly, teachers of this calibre are difficult to find, but the effort to obtain them is worthwhile. The degree of integration is extreme when the chemistry instructor is also responsible for third year mathematics for the same groups, or when the biology teacher instructs the general science group which he will receive as students the following year. In the latter instance, there is no mental reservation or physical restriction upon use of "high school" material to explore in depth some aspect of the general science curriculum, and all materials, including texts, are within the same room. Also, due to the nature of such patterns of organization, teachers and pupils get to know each other "in depth."

E. Reading Instruction. The ability to read is basic to the acquisition of all other knowledge, and instruction in reading supports the structure of the curriculum in all schools. Since many physically disabled children have reading problems, a specialized program of reading instruction in a school for physically disabled children must parallel all areas of curriculum studies and be consciously integrated with each subject.

At Human Resources School a reading readiness program is carried on in the nursery, kindergarten and first grades, employing modified Montessore methodology, perceptual training materials, and other instructional techniques particularly suited to the disabled child. The upper elementary school program is eclectic; the children are taught on an individualized basis depending on their previous experience and needs.

Dr. Jeanne Chall (1967) has stated that her review of research on beginning reading instruction methods has indicated the need for correction, de-emphasizing a meaning-oriented method and encouraging a code-oriented method. She does not endorse one code-method over another, stating that there is no evidence to date that ITA is better than a linguistic approach or vice versa. In partial disagreement with Chall, in a study done at Rutgers University Reading Clinic, it was determined that there is no appreciable difference in performance of students based on methodology, and that the quality of the teaching rather than the method used makes the difference between good and poor reading achievement (Fry, 1968).

Elementary teachers at Human Resources School use a variety of methods, including specialized perceptual training materials, SRA Reading Kits, basal readers, work with phonics, and a strong school library program, to encourage the widest possible reading experience. As increasing numbers of students complete the full Human Resources School elementary program, it is expected that average reading levels of the secondary school pupils will show marked improvement. However, admission of new students into the seventh and ninth grades, because of cutoff points in school services to the physically disabled, will continue to cause secondary level reading problems.

An evaluation of the reading ability of students in grades seven through twelve by a reading specialist reaffirmed what some observers (Lawrence, 1962) in other schools for the physically disabled have found; namely, that reading retardation is a major problem. Interviews with others, such as the principal of the Widney School of Los Angeles, also attest to the widespread nature of this problem. Supplementary reading instruction on the Junior High School level is a necessity. Continuous reading instruction should also be provided in an integrated studies program of English and social studies, as well as in other subject areas, such as science, where use is made of current, high interest periodicals, written for this chronological age level. There is a great need for further research in teaching reading to young adults who are many years behind in this skill. Chall (1967) does not recommend the use of a code method for these older students; however, there has been significant work done in the use of ITA with adult illiterates. The employment of ITA with young adults, whose reading problems are more similar to those of adult illiterates than to the problems of the younger child, might meet with some success.

As an alternate proposal, it has been suggested that where traditional grade patterns are followed, students who are chronologically ready for Junior High School be held for one year in a transitional class with intensive reading and basic mathematics instruction, omitting the regular seventh grade curricula in science and social studies. The following year they would progress to seventh year and resume the normal course work supported by remedial instruction in reading.

F. Testing, Homework, and the Teacher Aide. Gaps in the educational background, caused by continuous medical care and the informality of home tutoring, may place the physically disabled child at a particular disadvantage when he is required to compete with his peers by means of commonly accepted testing methods. The non-disabled student who comes up through the standard educational system is "test wise," due to years of experience with tests of all types. In addition to this, he has normal manual dexterity, and his testing performance will not place psychological pressures on him other than those normally imposed by the clock.

This skill, which so often is taken for granted, has remained undeveloped in the disabled child. The secondary school physically disabled student who has not had the advantage of a special school finds himself at a disadvantage. He must somehow compress eight or more years of missing experience into his secondary educational experience in order to compete favorably with his peers for college placement and scholarships. In order to correct this deficiency, the instructor must be wise and skilled in tests and procedures. This training must be provided since testing permeates the entire curriculum in our present culture. The future of the academically orientated physically disabled child is imperiled if skills with pencil and paper tests are ignored. The slow starter is usually penalized by such tests. This form of testing may be a measure of motivation, interest, or knowledge of how to prepare, not a gauge of intellect. Preparation for examinations is best accomplished by giving these children varied experience with similar instruments over their secondary school years.

While taking care to educate students in the art of successfully taking a test, the teacher of the physically disabled child faces the practical problem of evaluating the student at his present level of ability to communicate. Some attempt oral exams, or the use of short answer objective exams where writing skill and speed is not a large factor in the final result. Of course, this is not relied upon exclusively. Skill building in the writing of essays must also be developed.

In those instances where students have muscular weakness and writing speed is below normal, more time must be allowed for examinations. A good way out of this dilemma is to stress power tests rather than speed tests. If power is emphasized, the student can be allowed as much time as he needs. If this modification is not made, the examination may become more a measure of manual dexterity than intellectual achievement. However, at this point the educator is faced with a problem. To allow unlimited time for testing would be unrealistic. The teacher must try to assess what amount of time is necessary on an individual basis. A study to establish proper guidelines for gauging time requirements on competitive exams is sorely needed. At present it is difficult to justify the additional time requirements to test makers, some educators, and particularly to other disabled students who may arbitrarily be granted less additional testing time.

If the teacher aide or volunteer worker must act as writer for a student during the testing process, great care must be taken to instruct both the student and the aide against the tendency to apply two minds to the problem. The student who cannot write and who is accustomed to utilizing some other person's hands for transcribing his thoughts may be skilled at accepting facial or other cues which the assistant may offer. Care must be taken to caution aides who actively assist the non-writing student rather than acting as transcribers of student thinking.

It is assumed by many, particularly teachers of mathematics or teachers whose courses require extensive reading, that homework must be a student responsibility. The same problems exist for the physically disabled child concerning homework as in other areas of school work. In brief, the physically disabled child lacks the background of experience which would habituate work patterns at home. A lack of physical stamina and the difficulties involving transportation may also confound the student in his attempt to fulfill homework responsibilities. For example, many of the students may travel up to two hours by bus to get to school. Often travel time, toileting, bracing or dressing requirements deprive the students of time for academic work at home.

When the parent assists the child in writing out homework the same cautions must be applied as with teacher aides.

In order to reduce fatigue and simplify the problem of access to information for homework and study, each student can be provided with a double set of textbooks. One set of texts remains at his home. A duplicate of the texts are found in the various subject area rooms to which he must travel daily in following his regular school program.

When students are confined to hospitals, teachers and classmates may often visit. Unless a suitable programmed text is available, the continuation of schooling becomes the responsibility of the hospital teachers.

If a student is convalescing at home, the telephone company will install a speaker phone known as Executone in the classroom and at the student's bedside. In a large school system, such as Los Angeles or New York City, where up to twenty students may be convalescing, a new system of teaching by telephone has been instituted. This system is known as Tele-Class and was developed by the Pacific Telephone and Telegraph Company. The Tele-Class program is administered by a teacher whose sole function is to teach by telephone (Cassidy, 1966).

Whenever student absences are temporary, involving loss of a day or two of school work, the following system is adhered to by all. The absent student is responsible for calling a classmate or the teacher at the end of the school day. The class work of the day is discussed briefly and the assigned homework for the day is relayed to the student. This "buddy" system of continuing responsibility for homework maintains school contact and discourages needless absenteeism.

G. Automation. The promise which educational technology holds for the next 20 years is immense. The application of such technology to the education of the physically disabled child will increase the possibilities for the achievement of individualized instructional curricula and technique. Some advances in this field have been undertaken bv Human Resources School, but the need exists for further research and development. Instructional television has been integrated to some degree into the curriculum and utilized as a teaching instrument. Video taped sequences or segments of lessons are prepared by teachers for use in classwork or the monthly student seminars. Taped television lessons are available from the New York State Education Department. It is planned that such lessons, or lessons especially prepared by the teachers of Human Resources School, will be made available for review for those students whose educational progress is hampered by excessive absence. Pertinent current programs may also be taped directly off the air for use in the science, English, or social studies classes. The use of television in this manner parallels the use of motion picture film and admittedly is not in itself adequate for instruction. Ideally, such use is followed by sessions with the instructor or a tutor in order to clarify and reinforce learning.

Automated, programmed learning has not had a significant impact in the education of the physically disabled child as yet. Some work with severely disabled students in a hospital setting has been done. This work by Coss et. al. (1966) should set the stage for further expansion. While the small N's utilized in these studies may not offer conclusive findings, the implications for further work are favorable. At the present stage of the art, those aspects of curricular study which lend themselves to easily programmed sequences should be adapted and presented to the physically disabled child when this approach seems most efficient. At present, automation at Human Resources School is limited to study carrels utilizing semi-automatic filmstrip sequences that parallel curricular offerings. This is a primitive pattern and less desirable than the automated sequence that could be offered via computers.

Programmed texts have been useful. For example, one student was absent from a chemistry course. Principles of Chemistry by Harris was used to parallel classwork. Upon the student's return, intensive review of materials which he had to master helped bring him up to par. Hospital schools have not been too successful in keeping secondary students on course in chemistry, advanced algebra, and other complex courses. The skills required, including theory, materials, and facilities for lab practices, are beyond the scope of a hospital teacher.

CAI as a sole means of instruction is probably not desirable. Social and personal development will not find fulfillment by communicating with a machine. "Live" or face-to-face interactions in verbal and non-verbal communication between teacher and student, or among students, is an extremely vital element in the school experience.

H. Classroom Procedures. Jackson (1968) indicates a need for research on learning as it occurs in schools, as distinct from learning theory gleaned from laboratory research. The work of Flanders (1964) and others seems to be following this trend. Jackson notes four characteristics of classroom climate derived from interviews with elementary teachers. There is a tendency toward immediacy and opportunism, informality in teaching method, autonomy with regard to implementation of curricula or school regulations, and individuality in terms of the way teachers approach individual students and student groups.

Flanders' (1964) findings concerning teachers who can successfully adapt varying roles to meet existing classroom needs also seems to suggest a pattern for improving teacher effectiveness. The indirect, as opposed to direct manner of teaching, correlated higher with greater student achievement. The teacher able to shift from direct to indirect approach, that is, able to modify behavior with the needs of the moment, seemed to be most effective. Problem learners, being less well motivated, less conforming, and thus least successful in adapting to the needs of the traditional classroom environment, would find such teachers the necessary buffer allowing for gradual accommodation to the demands of the learning environment. Ryans (1964) identifies attributes of the good teacher as being child centered (permissive) in philosophy and superior in verbal comprehension and emotional stability. The teacher must exhibit wisdom, be a good listener, and support and encourage the students' response to suggestion. The teacher must be given adequate time to supply these needs.

Many teachers of physically disabled children would recognize these general elements as familiar, and yet there are some differences worth noting. Because of the added attention the physically disabled child may receive during early stages of his upbringing, this child may often seek or attempt to command greater attention from his teacher. Characteristic patterns for attention getting seem to involve excessive verbalization and the desire for one-to-one tutorial relationships. This may often cause conflict, for as Jackson (1968) has noted, teachers prefer to administer group instruction rather than tutorial instruction. However, lower pupil-teacher ratios found in classes for physically disabled children may help to satisfy this apparent need of the disabled child.

At the risk of appearing to depricate the structure which organized curricula represent, it is necessary to reiterate that the vital element in mastery of curricular materials is the teacher's ability to inspire scholarship. The power of teacher personality and style cannot be minimized. Even the most logical, systematic curricula will be stunted and warped if the vital sparks of imagination, humor and affection are lacking. Each teacher, in essence, presents a programmed lesson in life, a complete example of working attitudes and values, which his students absorb unconsciously. This effect may be the most pervading and lasting influence on the child, one that outlasts the memory of geometry or algebra, or the cardiovascular system of the frog. Jackson (1966) expresses this aptly as he quotes Sir William Osler in The Way Teaching Is: "No bubble is so iridescent or floats longer than that blown by the successful teacher."

ELEMENTARY EDUCATION

A. Introduction. According to Barsch (1967) the infancy of man is devoted to the establishment of those patterns of cognitive and physical movements which will support a lifetime of adaptation to being a whole person. Beginning with the work of Jean Piaget, new discoveries have greatly expanded knowledge about the ways in which children learn. Throughout the early sensory-motor period and the beginning of abstract reasoning, the young child's emotional and intellectual development depends jointly upon the experiences with which he is presented and upon a reconstruction of the world he sees. Whereas Piaget has contented himself with reporting these psychological discoveries, Hunt (1961) and Bruner (1967), among others, have concluded that children who are deprived of early intellectual stimulation will never reach the heights of which they might be capable. Benjamin S. Bloom estimated that there can be a difference of 20 I. Q. points based upon environmental factors (1964). These theoretical assertions are supported by data obtained in animal experiments, such as those of Harlow (1962), Scott (1962), and Levine (1960).

The child who is born physically disabled is severely limited in the experiences he gains during this important period of explorative development. Physically disabled children who have been restricted in their experiences can be expected to show a slower rate of social, emotional, and intellectual growth (Connor, 1967).

In developing a school curriculum for the disabled child, it is important to be aware of the severe perceptual and motor deprivation which he may have experienced during his infancy period, as well as of his probable social and emotional deficiencies. It is necessary to fashion a curriculum which will draw from both traditional and experimental theories of instruction for the able-bodied child, as well as from the many teaching methods which have been devised for children who are culturally deprived or who have learning difficulties. What must result is an eclectic method of education which is suited to the disabled child's needs and which can compensate for his earlier deprivations.

B. Pre-School. An illustration of an effective pre-school program is the curriculum at the Human Resources School. The aim is to give physically disabled children a background of educational experience which will prepare them for entrance into elementary school.

These children, ages three to five, have been limited in early experiences due to severe physical disabilities. The school environmen helps them to learn behavior patterns which will facilitate their adjustment to the educational process.

For a pre-school program to adequately perform its functions, it is first necessary that the child be carefully evaluated in order to determine his present capabilities. In planning each child's individualized program the staff makes use of the following tests which are administered to each youngster entering the school:

1) Merrill-Palmer Scale of Mental Tests
2) Peabody Picture Vocabulary Test
3) Harris Test of Dominance
4) Frostig Test for Visual Perception
5) Children's Apperception Test
6) Driscoll Kit
7) Word Test
8) Vineland Social Maturity Scale

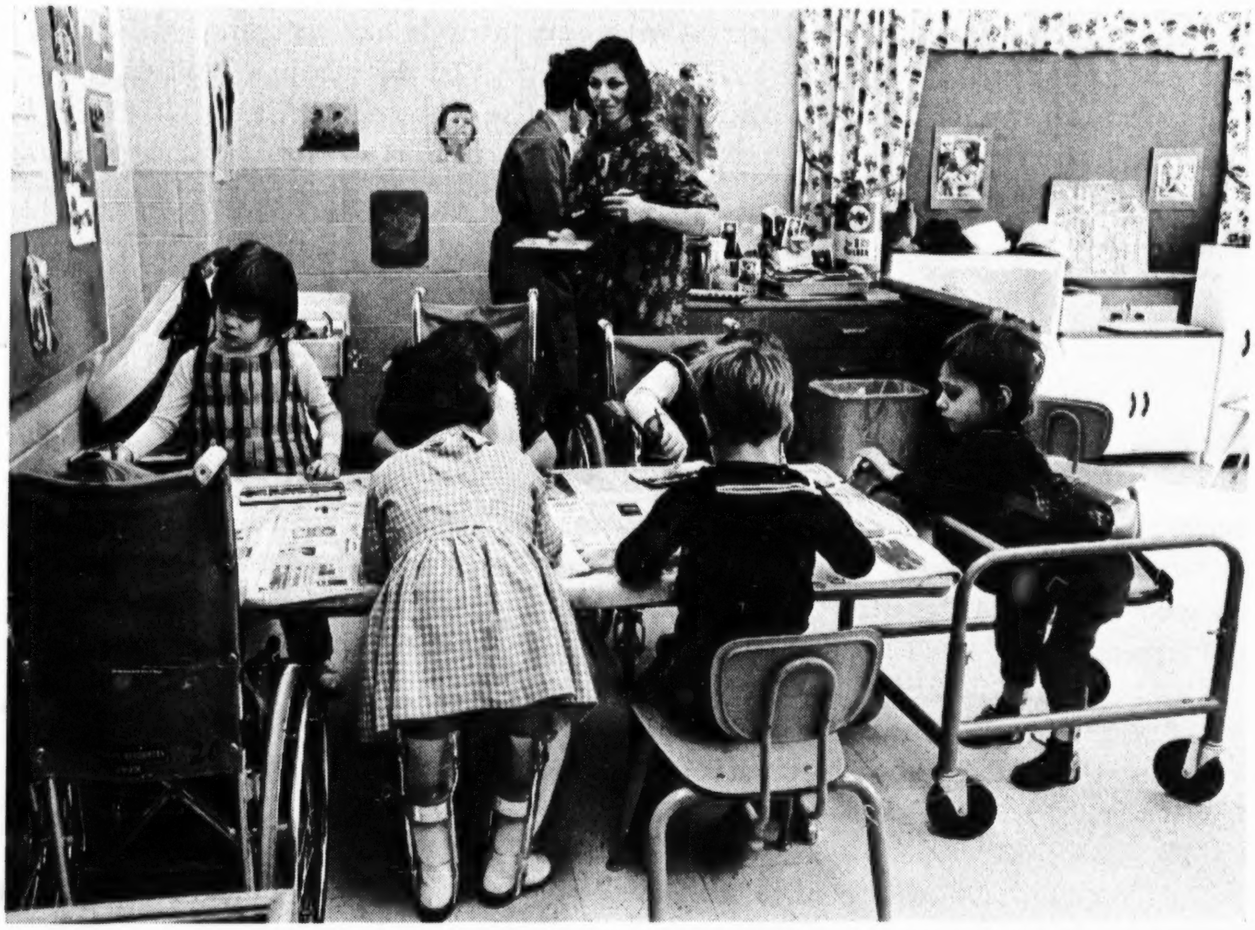

FIG. 1. A pre-school group engaged in art activity.

Whereas Bereiter and Engelmann (1966) in their work with the culturally deprived have attempted to accelerate intellectual growth, at the Human Resources School, in working with the physically disabled, emphasis has been placed upon providing concrete experiences with a concentration upon language, social, and perceptual development. It is believed that children with disabilities make more progress when the school tries to meet their total needs rather than focusing on overcoming a specific handicap. Teachers who are trained in early childhood education and who have worked with able-bodied children seem to have the basic foundation upon which they may build to develop those skills so necessary to help disabled children grow. Figure 1 shows a group of pre-school children at work.

Among the specific types of experiences which are important are learning to socialize and associate with members of the peer group, and learning to live with a disability and to use appropriate aids, such as prosthetics and orthotics.

If a disabled child is not offered more than the able-bodied in stimulation, training, and opportunities to socialize, the effects of his disability are certain to increase even though his original disability is not progressive (Gordon, 1966). In order to develop a sound program it is necessary to isolate and evaluate the learning disabilities of each child. Therapeutic measures can then be initiated during the preschool period, and physical therapy can be incorporated into the goals of the play situation.

The needs of young disabled children must be met on an individual basis. To this end, at Human Resources School, two certified nursery school teachers work with eight children for a two hour period. Morning and afternoon groups are organized according to age and maturity. Teachers are assisted by either a student-teacher or a Teacher Aide. Contrary to the usual nursery school schedule, the day begins with a structured period, during which one child at a time is taken aside to work on a particular problem. For example, a child works on a picture puzzle and the teacher attempts to help him see the pieces as a whole.

The preschool curriculum at the Human Resources School includes the following activities designed to meet specific objectives (Switzer, 1966):

1) Creative play activities: Playing house, building with blocks, and other forms of dramatic and creative play are used in the

training and instruction of manipulating prosthetics and the developmen of language.

2) Sensory experiences: Individualized methods adapted to the child's disability are developed for activities such as water play, finger painting, sand play, bead stringing, working with puzzles and playing with blocks. These methods sometimes involve the use of adapted toys, or training in the use of prosthetics such as artificial arms.

3) Development of language: Daily group conversation, role playing, listening to and retelling stories, and picture book story hours all contribute toward helping the disabled child develop in his use of language.

4) Science: Activities include caring for pets, becoming aware of changes in the weather, and watching plants grow. Interest has been stimulated by visits from Human Resources High School students who have performed simple chemistry experiments. The experience, involving cooperation between the nursery school staff and the high school science teacher, has been mutually beneficial.

5) Music: Singing, responding rhythmically, learning how to use rhythm band instruments, and listening to records, are all part of the program.

6) Field trips: Frequent field trips into the community are imperative for the disabled child who has often spent the first years of his life in a protected home environment.

7) Self care and health: The disabled preschool child is taught how to handle toileting problems, proper methods of grooming, including brushing teeth, washing, and bathing.

8) Adapted physical education: A program of recreation and adapted physical education is carried out by the staff in cooperation with a physical therapist and under the direction of the School's Medical Director. The disabled child who does not have full use of arms, legs, or other motor movements must retrain certain large muscles to help his awareness of spacial relationships.

9) Social training: Association with other children and adults, role playing, group games, team cooperation and other activities of a social nature have contributed to helping the children develop

socially. The overcoming of self pity is one of the major aims of this program.

10) Motivation: Early nurturing of the desire to learn is of primary importance for the disabled child. Direct and vicarious experiences utilizing films, slides, picture books, film strips, art and music in various forms are all employed to this end.

11) Parent counseling: Parent conferences are held periodically with the teacher, psychologist, and medical director in order to discuss in detail the child's individual progress. Parents of disabled children must learn how to chart a program of beneficial rehabilitation for their particular child. They require information on special hospital facilities and other medical services, as well as the locations and nature of the various state, county, and community agencies which may be of help.

Students in the pre-school program are retained for either one or two years, depending on age, emotional maturity, and readiness for undertaking the kindergarten program.

C. Kindergarten. In the kindergarten program at Human Resources School two teachers work with ten children to assure the maximum in individualized instruction. Teacher aides and student-teachers are also employed. The kindergarten curriculum combines aspects of a conventional program for able-bodied children with the more highly structured curriculum of head-start programs for the culturally deprived.

Conventionally, a kindergarten program begins with a free play period. Since many disabled children have a short attention span and fatigue easily, it has been found more desirable to begin their day with a structured activity which is short and frequently changed. Throughout the program there is a greater emphasis on structure than in a regular kindergarten.

The objectives of the kindergarten program are to encourage reading readiness, develop muscular control, and establish self-confidence. The curriculum includes the following subject areas with activities designed to meet specific needs:

1) Language Arts: Language is one of the most critical areas of development in the young child. Disabled children may suffer language deprivation because they have less social interaction with other children and adults. Some must learn to communicate; others may have a pattern of excessive verbalization. These observations at Human Resources School have been corroborated by teachers in other schools for handicapped children. Teachers at the Newcastle School in Placer County, California, have observed that some children exhibit severe memory problems and a high level of distractibility. Sharing time, or show and tell, continues to be one of the most valuable activities for these children. It is interesting that this activity has declined in usage in regular programs in recent years.

Language development is further encouraged through dramatization of stories. In this area the teacher must use stories where movement of the characters is restricted. The teacher must be careful in selection and editing of materials. The children move in their wheelchairs and make maximum use of props and costumes. Puppetry is a very important activity which is further refined and developed in the upper grades. Flannel board is employed as well as tape recorders and film strips. Field trips into the community are an important part of the school year. Techniques in the reading readiness follow-up program include the use of experience charts, dictation of stories to stimulate recall, practice in organizing ideas, stressing the relationship of spoken and written word, focusing upon the sequence of events in a story, and the identification of letters and words.

2) Art: Art, traditionally a non-directed activity, is used at Human Resources School to train muscles and develop hand-eye coordination. Through experiences such as tracing inside and outside shapes, and cutting along lines, the disabled child practices motor control. Tactile materials such as cut-out letters and numbers in sandpaper, felt, play dough, and other surfaces, are incorporated into art projects.

3) Music: In music a great deal of early childhood material requires large muscle activity. Some of the adaptations of the music program are the use of musical games involving only the upper torso, stimulating movement by clapping, the use of rhythm instruments, the waving of scarves and swish sticks, and swaying in rhythm to music. Imaginative use of such materials as sound effects records have produced rewarding results in terms of movement and dramatic play.

4) Physical Education: All activity games are aimed toward achieving maximum movement wherever possible. The children are placed on the floor to sway, play simple games involving the upper torso, and throw balls and beanbags. Large toy trains and cars are very important pieces of equipment for general play in any kindergarten. They serve Human Resources School non-ambulatory youngsters as transportation devices and are used to further encourage dramatic play.

5) Mathematics: Number games are played to help develop number concepts. Through the use of the Human Resources high school facilities, such as the Home Economics Laboratory, it is possible to involve the children in firsthand experiences with activities such as cooking (to reinforce concepts of measurement).

6) Science: Activities in this area are carried over from the pre-school program with further firsthand experience provided by using the school's indoor greenhouse to teach the growing of and caring for plants.

Thus, the kindergarten program aims at giving the children as much normal school experience as possible within the framework of their physical limitations and specific needs, to achieve maximum preparation for entrance into the first grade program. Early results have been encouraging. One youngster who did not utter a word until the very end of his nursery school year made exceptional gains in the area of communication during his kindergarten year.

D. Primary Grades. At Human Resources School there is a difference between those children who have been exposed to the pre-school and kindergarten programs and those who have been admitted directly into the upper grades. Preliminary findings seem to indicate that disabled children who have been deprived of socialization and gross motor movement during the period of infancy can compensate and will benefit greatly from a pre-school and kindergarten program geared to their special needs.

A primary school program for disabled children must be organized according to ability rather than designated grade level. At Human Resources, students who have had previous experience in the school are grouped together and make good progress in a program which closely parallels a curriculum for able bodied children. Basal and Supplementary readers are used in the reading program. In addition, the children pay weekly visits to the school library for a story hour and make use of a wide variety of Easy Reading Books (controlled vocabulary). A classroom collection of these books remains on loan throughout the year and the children are exposed to a wide variety of reading experiences. Simple social studies concepts are handled in conjunction with many field trips into the community.

In the area of arithmetic, success is attributed to pre-school and kindergarten readiness experience. The classroom teacher has created her own work materials for the most part in this subject, finding workbooks inadequate for presentation of material. Most of the children finishing second grade level can add, subtract, carry, do simple multiplication and division, and add and convert fractions. A traditional presentation of material has been aided by the use of many visual concepts such as pie slices, etc.

For children with a multiplicity of handicaps or no previous school preparation it is advisable that each teacher work with a small number of students. Low degree of social experience and lack of preschool preparation make it difficult to categorize these children or make definite judgments as to academic potential. The most important objective is to help them function in a group situation by presenting them with many experiences. Indirect learning is presented through posters with pictures, numbers and words, games involving number sequences, and many discussions. Integration is the key in the curriculum: integration of mathematics concepts with art, music and science, and integration of language arts with everything else. Nothing is assumed and the teachers must make constant verbal observations. For example, it cannot be assumed that clay hardens and changes color. The clay must be felt, observed, and discussed.

E. Upper Elementary Grades. For most of the students it is not possible to cover a complete year of state required curriculum in one academic school year at Human Resources. This is due to poor academic preparation, social and emotional immaturity, absenteeism, and in some cases physical weakness which renders the child incapable of working at a normal pace. It would seem natural to institute a completely non-graded curriculum. There is a great deal of literature to bear testimony to the fact that there has been widespread adoption of non-graded practices at least in the elementary years; however, much that has been done is superficial (Goodlad-Anderson, 1963). In addition, parents and children alike continue to need guidance in order to accept a completely ungraded program and disregard yearly promotion. A more highly structured parent/student counseling program to handle this and other problems is a much needed future project.

At present, the Human Resources Elementary School has one classroom for each grade level. To aid the regular teaching staff and the many special teachers, the school has benefited by having student teachers and special tutors at its disposal, some on a voluntary basis. It has been found that children lacking in educational experience and accustomed to home tutoring continue to benefit by a one-to-one relationship, while at the same time developing social skills and emotional strength in the classroom situation.

Within each classroom, multilevel instruction is carried on to suit the individual needs of the students. While multilevels of reading and mathematics ability do exist within the classrooms of most schools, it is probable that this situation exists to an exaggerated degree in a school for disabled children.

1) Language Arts: Reading levels range from second through sixth grades. The use of SRA Reading materials enables the teachers to carry on a completely individualized reading instructional program. In addition, an independent reading curriculum, involving constant use of the school library as well as classroom collections of books on loan from the library, gives the children the opportunity to read widely on their own reading levels. Reading guidance on a one-to-one basis between the teacher, the librarian, and the children is the reason for the success of this program.

2) Mathematics: In the area of arithmetic a few of the children are able to perform on grade level. The staff uses many different methods and a wide range of workbooks in order to bring to each child the kind of approach he requires. Most of the children need a concrete, traditional approach as they find it difficult to handle abstract concepts. Instruction in arithmetic is handled in very small groups, employing teacher aides and student teachers to give highly individualized instruction.

3) Social Studies: While the major concentration in these grades is on acquiring language arts and numbers skills, the New York State curriculum suggestions are followed in the area of social studies

to some extent, in order to give the children the experience of reading in a subject area, learning to use the library, and beginning to organize materials to write short reports. The younger children study their immediate community by means of field trips and learn something about early American history, the structure of our government, and the importance of national holidays. The fifth and sixth grades have studied American history and world history in alternate years. Those who are able to do so follow a grade level text. The students who are below grade level in reading are able to find library books in the high interest/low vocabulary category. The teacher prepares her own materials so that all students are able to obtain maximum benefit from this activity.

4) Elementary Science: It is less difficult to accomplish the objectives of science at the elementary level than at the secondary. The elementary child's lack of sophistication or absence of the many competing interests of the adolescent enables him to follow his curiosity and become immediately involved. Disabled children exhibit enthusiasm for science studies, and the curriculum and instruction process should nurture this enthusiasm. The materials and program of the Elementary Science Study group of Newton, Massachusetts, helps to accomplish this objective, complimenting and reinforcing the suggested elementary science program for the State of New York.

Science studies at the elementary level are integrated with the study of reading, written expression, spelling, and arithmetic. The high interest of the science studies thus generates momentum which carries over to other areas of learning.

While this approach may be valid for instruction in elementary science for all children, it is felt that this approach is indispensible in teaching the disabled child. The disabled child requires materials which he may manipulate, which will allow practice in observation, which will develop confidence in his abilities, which will provide practice in working cooperatively with others, and which will give him practice in self-directed activities that require the use of imagination and thought. The most important task the physically disabled child must accomplish is that he must come to see himself as a person able to think and create for himself. The science activities in our elementary school foster the development of this self image.

Academic subjects are supplemented by instruction in art, music, physical education and library usage which are discussed separately in this report.

SECONDARY EDUCATION

A. Introduction. Experience at Human Resources School has indicated that many children with non-sensory physical impairments who participate in courses where the major activities are oral discussion and reading, will not require special teaching methods. Within these course areas there is a minimum of adaptation of curriculum, equipment, and material for the physical disabilities of the student. However, the process of instruction for students involved in certain other courses does require adaptation. Due to the nature of the activities and the manual dexterity required, courses of study such as Physical Education, Art, Science Lab, Home Economics, and certain areas of Business Education, must be specifically adapted as required.

B. English. Literature is the core of the English program. In practice the program becomes integrated with various other areas such as history, anthropology, sociology, and economics, which are taught in the social sciences. Through careful planning, English and other subjects, such as social studies or music, become interdisciplinary. There is extensive use of paperback materials because such books are more easily handled by the physically disabled child. The major problem with the disabled child, as often is the case with the non-disabled child, is poor skill development in the use of written and spoken English and reading. Slowness in writing due to physical disability and irregular school attendance has compounded the problem.

Teachers admit reluctance to assign lengthy written homework in view of the slower writing speed of some students, or the consideration that the physically disabled child has less time for evening assignments. To overcome this problem, groups in need of special skills training are selected, and such groups are provided with the special attention they require. Isolating small groups with special needs, and providing such groups with additional time and attention, has enabled many students to improve their skill level.

A second major problem which must be considered is that of the poor experience background of many physically disabled students. Because of their disability, or a combination of factors, they are in effect culturally deprived. For example, there is a poor understanding of the circus and the theatre. Backgrounds in mythology and the fables of childhood are often weak or non-existent. In English much effort is directed toward these cultural deficiencies. Experience is provided either firsthand or vicariously, in an attempt to bridge existing gaps.

C. Social Studies. There has been integration of social studies with the English and science programs. The study of anthropology and the evolution of man, and the origin of social patterns motivated by biological needs, are a few of the topics considered. This integration has been accomplished by teaching teams.

Other patterns of education in the social studies have been developed to resolve special problems. For example, in an eleventh grade class where approximately half of the students have inadequate background and half are more literate, mature and academically oriented, the group might be too small to justify separation into two distinct classes.

The successful resolution of the problem of providing a complete program for all would involve the development of the tutorial seminar, affording academic and cultural enrichment and an opportunity for independent studies. The work of students assigned to independent studies would culminate in a research project, student and teacher planning determining its specific nature and form.

The suggested New York State syllabus is taken as a guide for the social studies program at Human Resources School, with some modifications. The seventh and eighth grade classes spend approximately half of their time on New York State history and half the time on American history in each grade. This is beneficial because it provides an early introduction to American history and a continuity within the program. The conceptual approach to problems in American history, which is recommended for the eleventh year program, is thus provided with a firmer foundation. The suggested patterns of study of Cultures and World History for the ninth and tenth year programs are followed.

Due to great variations in reading levels two texts are utilized on the eighth year level. The material in one text is at the level of an eighth year student in terms of reading difficulty, and the other text is on the level of a fifth year reader. The contents of both texts correlate to the course of study.

In the ninth year the multi-texts concept is utilized. Throughout the year the students receive slim volumes of approximately one hundred pages. As the work in one volume is completed, it is collected and a new volume is issued. The psychological and physical benefits of avoiding a single three or four hundred page text is a positive value here. Students gain a sense of accomplishment as they see each small volume completed throughout the year.

In addition to the use of multi-level texts, the school library is utilized constantly in the social studies program to provide supplementary books, reference materials, and periodicals on third through twelfth grade reading levels.

D. Mathematics. The curriculum in mathematics, as suggested by the New York State Education Department, is not greatly modified in content. Some adaptations have been made in pacing and instructional technique, particularly at grades seven through nine. These are the years in which secondary students must develop sufficient skill in mathematics so that they can function successfully in the more advanced courses of the sciences and mathematics. Failure to develop the necessary mathematical skill for future courses at this level of schooling may be crucial. In order to prevent a loss of interest in the subject when a successful experience is not encountered in grades seven through nine, extra effort is exerted in mathematics education during these years. If skills are deficient, the following techniques and adaptations are employed.

1) Small groups are stratified according to skill level.
2) Tutorial instruction is provided during class or during study periods.
3) Additional time is provided for instruction of the class group.
4) Teacher aides assist instruction during class time.

The use of the overhead projector allows improved techniques in mathematics instruction for the disabled child. Often he cannot do board work and may use acetate sheets and the special pencil required to write on it as a substitute to provide a written sample of his reasoning on some particular mathematical problem. His notes written on the acetate can be projected for discussion by all. The low cost of acetate slides allows temporary preservation of such slides containing problems, notes, and diagrams. Material covered may be re-studied by students requiring a review of the materials presented during the lesson.

Teachers have noted one particularly striking need in the area of general mathematics, the need for disabled students to have practice and experience with use of money. It is suspected that the non-disabled child has many more opportunities to use money than disabled children. Such children run errands for parents and have greater access to commercial establishments. At Human Resources School some mathematic experiences such as school store activities are planned to compensate for the deficiency.

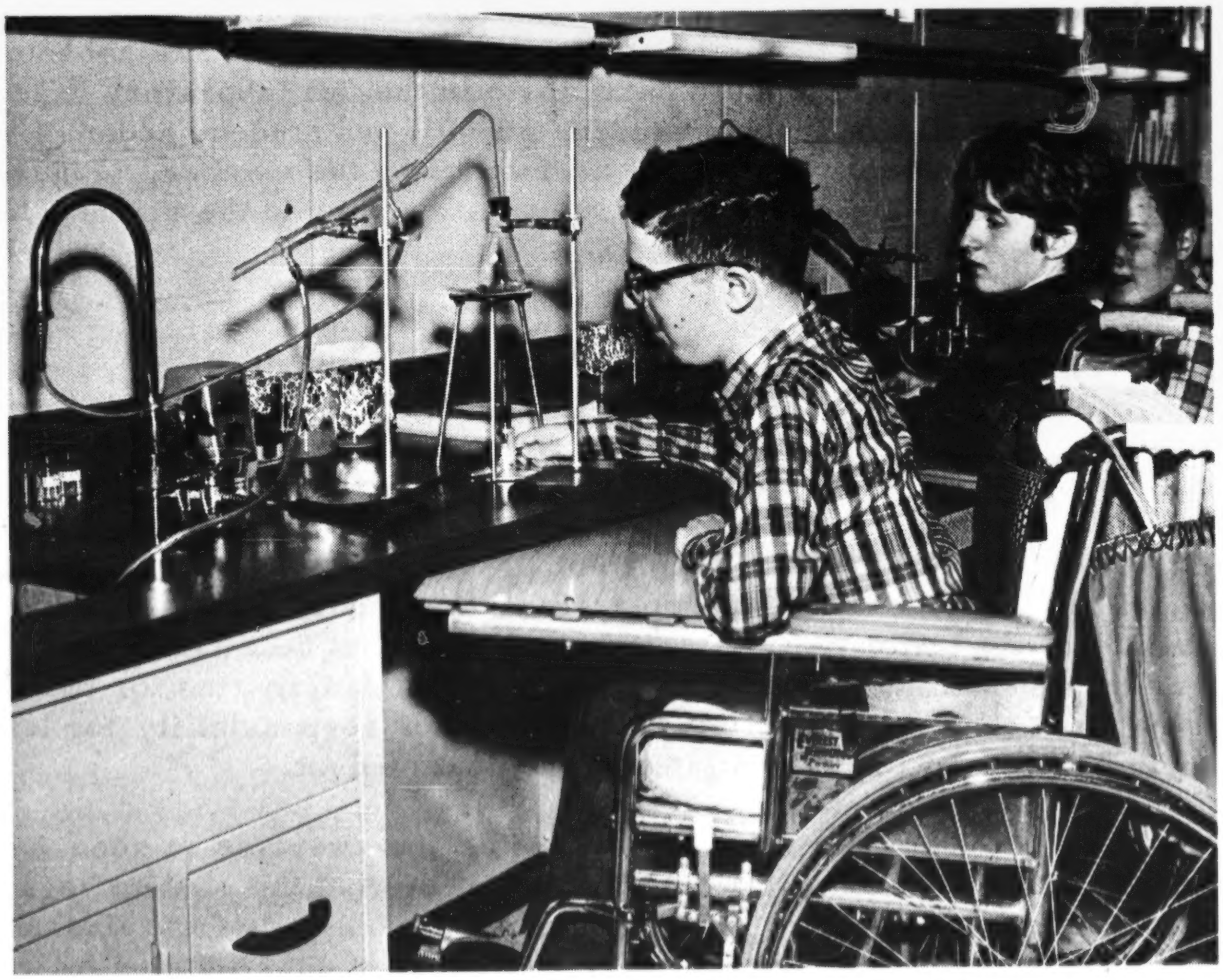

FIG. 2. A group of general science students conducting an experiment with distillation apparatus.

E. Science. The curriculum in science is essentially the New York State Syllabus in General Science, Biology, Chemistry, and Physics. The design of the Human Resources School laboratory allows the physically disabled child to obtain firsthand acquaintance with the processes of science. Laboratory work is designed to reinforce basic concepts learned during lectures and to develop skill at application of these concepts to specific problems.

Some students desire fulfillment in seeking answers to current interests, and this curiosity is nurtured by the teacher. Some students combine this curiosity with a desire to attain some vocational goal. Others, with severe limitations of manual dexterity and less capable of manipulating laboratory equipment, may seek to become theoreticians. This latter group will team up during lab with other students capable of manipulating equipment. Both participate in the full laboratory experience. The emphasis is upon student activity and student accomplishment with a minimum of physical assistance by the teacher. Figure 2 shows a group of General Science students at work in the science laboratory.

Some compromises with the normal lab procedures are made in order to improve learning efficiency. Since physically disabled children are not as rapid as non-disabled students in obtaining and transporting apparatus and reagents from various stock supplies located within the laboratory, materials are delivered to the student's work station by two teacher aides. As much as possible, materials needed for a laboratory session are placed at the student's work station prior to the lab activity and also replaced at the end of each session. In Chemistry the utilization of semi-micro equipment facilitates this task. This offers maximum working time at actual lab activities for the disabled child, but it does not instill the sense of responsibility for leaving a cleared work area available to the next student.

Throughout science lab activities the exercise of good judgment is demanded. Care must be taken to instruct the student regarding the limitations of his body movement. Problems of carelessness must be avoided. The use of small quantities of acid dictated by work with semi-micro equipment precludes serious consequences in cases of error. The preventive approach is emphasized by the instructor. Much is made of this point because the physically disabled child is less able to react quickly to hazardous situations.

Occasionally, special adaptations to improve a student's ability to complete lab work is made on the spot. For example, where a student has partial paralysis of one hand and little finger control, it is often possible to be extremely effective with this less able hand if the instructor provides a solid metallic block which may be utilized as an aid. Its base can be friction taped to prevent sliding and the upper surface can be curved to match the curvature of the palm of the less able hand. Placing glass tubing or other material, which could not normally be held, between the palm of the hand and the block, a student is able to effectively shape glass tubing for lab needs. This device is also used as an aid in home economics activities and art activities.

It must be stressed that 90 per cent of disabled students are capable of accomplishing the science lab activities required by secondary schools in New York State. Such activities include genetic studies with Drosophila cultures, bacteriological work, elementary biochemistry, and anatomical microscopy. Experiments on plant growth and development involving a study of such variables as the photoperiod, wave lengths of light, minerals, hormones and other chemicals are carried on in the school's greenhouse. In addition, students plant and care for specimens of personal interest. The skills of plant propogation and culture are learned as part of the curriculum and practiced during the pursuit of leisure time activity in the greenhouse.

Topics germane to sex education are discussed as a part of the curriculum of general science, biology, and guidance. Instruction in personal hygiene which is given to students on an individual or small group basis involves aspects of sex education at times. The school nurse is responsible for this instruction. This area needs further development.

If note taking is required, the instructor must take care not to proceed too rapidly and minimize the amount, for the range of writing ability is limited with most groups. If the teacher utilizes an overhead projector, the acetate sheets which carry the notes may be borrowed for more leisurely recording of information or study outlines provided by the teacher. The question of duplicating notation has been considered, tested, and rejected for the following reasons: a. Skill in notation, which is essential for most students in higher education is not developed; b. Dittoed notes tend to be taken for granted or ignored after the novelty of introduction. Students seem to value more what they have transcribed themselves; c. There is kinesthetic learning involved in review via notation.

In extreme cases where a student cannot write, a classmate will make a carbon copy of notation.

There is integration of studies to some extent between science and English. Outside reading consisting of one current magazine article per week in some aspect of science is required. Emphasis is placed upon the type of reading required for understanding of scientific concepts or data as opposed to general reading of news or reading of literature. Beginning with the seventh year, exposure and attention to this aspect of the student's education allows development of a very skilled science reader by the eleventh year. Library materials are constantly utilized as supplementary reading and enrichment.

The objective in learning these subjects is primarily intellectual, with the emphasis on theory and investigation, rather than description and application. However, the intellectual activity is often a creative enterprise, and is to a great degree an aesthetic experience for the child.

In the eleventh and twelfth year social studies curriculum, material is presented to promote an understanding of science as an integral procedure for finding solutions to social problems. This approach has lately been espoused by such educational philosophers as Broudy, Brameld, Smith and Burnett (Broudy, 1963, Brameld, 1961). Much more than the transfer of logical operations from formal disciplines to practical areas is involved, for judgments of relevance must be made. Air pollution, disposal of nuclear waste, and the proper use of insecticides are complex and multidimensional problems. In order to begin solving the various problems within the area, the students must decide what data and principles are relevant. They must also realize that the dynamics of human behavior and various economic considerations may not be ignored. In essence, this is the beginning of the study of multi-faceted problems which cut across the disciplines of science, economics, anthropology, and human psychology.

F. Business and Pre-Vocational Courses. Courses in business training are begun at the ninth year level. Introduction to Business is indistinguishable from any other similar high school course. While there are minor problems, these have not required great modification of the regular curricula. There is the problem of great variation in background of the student body which includes deficiencies in mathematics and in primary business experiences.

Since many students have been confined to home and hospitals, emphasis is placed on field trips, films, and guest speakers. Where field trips are not feasible, due to architectural barriers, a film can be utilized, or a lecturer brought in. The additional time afforded by the extended school year is of help in those instances where prerequisite skills are lacking.

The ninth year program, in keeping with the general objectives of a junior high school program, is exploratory in nature. Topics which are developed include consumer economics, banking insurance, budgeting, and vocations in the business field. The latter unit assists the student in vocational orientation to the business world. The Business Program at Human Resources School, in addition to offering a series of courses to non-college bound students, also provides electives for college bound students who wish to develop skills in communication, to enlarge knowledge in areas of consumer education, or to develop greater economic self sufficiency.

In the 12th grade, Human Resources School provides a course in data processing. The course represents an adaptation of the New York State syllabi to meet the students' special needs. It is designed to familiarize students with key punch, sorter, reproducer, collater, interpreter, and accounting machines. Key punch machines are available to the students within the classroom. Students visit the data processing service bureau operated by Abilities, Inc. to see demonstrations of other machines and for additional instruction. Figure 3 shows students receiving instruction in use of IBM machines. They are taught to wire control panels for these machines.

Two adaptations were made on the key punch machine. For a disabled student with short upper extremities, the formica table which supports the key punch console was removed and a cut-out made so that the operator's body could be brought closer to the machine controls. Another modification for a student with arm and hand involvement, required installation of two supporting brackets on the table which allow adjustment of table height for proper arm positioning to actuate the keys of the console.

A new two year program will provide an overview of equipment available in this field and will culminate with class members being trained in computer programming. The course will be modified to

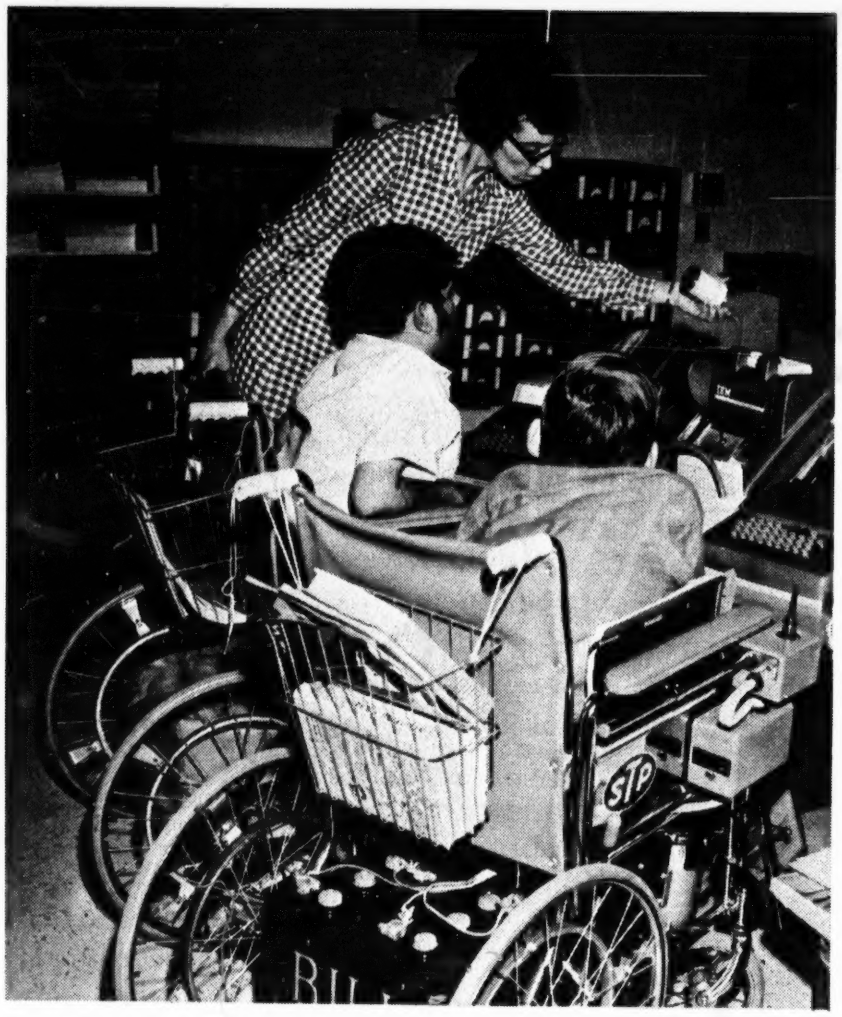
FIG. 3. Students receiving instruction in use of IBM machine.

meet needs of students who do not have mobility or the manual dexterity which would be required to wire panels and operate the unit record equipment.

Data processing coupled with computer programming skills seems to offer a most suitable vocational skill for the physically disabled person. At present programmers are in such great demand that some companies are willing to allow such workers to operate from their homes. N. Y. TIMES (1968) and SOFTWARE AGE (1968). Communication for assignments could be conducted by telephone and mail.

Retailing courses (I and II) are provided for students in the tenth and eleventh year. Emphasis is upon an understanding of distributive occupations and the use of the telephone in sales in such areas as life insurance, securities, and retail selling establishments.

A record keeping course is designed for the slower tenth year student who may not be capable of assimilating some of the other courses. There is a great demand for workers with this level of clerical skill. The course provides students interested in business education with a level of tasks within their range of accomplishment.

The Human Resources School business students are members of the Distributive Education Club of America (DECA) and have an active branch at Human Resources School. Participation in DECA allows the students to compete with those from other high schools in such events as the store window display competition and the poster and merchandise math contests. This type of competition, which requires students to meet with their able-bodied peers, is beneficial.

In many instances the physically disabled child will take typing to improve communication skills rather than for vocational goals. The typewriter enables some students to write faster, more legibly, and with less fatigue. Emphasis is placed upon development of ability to transcribe, by previewing material to be copied, and to retain phrases while typing. Development of speed and accuracy is important. To assist speed development the tachistoscope is employed. The student must also be taught the proper stroking techniques for his particular disability. In some instances mechanical aids are used. Where there is insufficient finger pressure a pencil will usually provide sufficient leverage to allow stroking and will permit the student to reach all of the keys. Students use electric typewriters.

In instances where there is limited use of one hand or no finger strength in one hand, techniques may be worked out on an individual basis to allow some function of the hand in the operation of a machine (Richardson, 1959). Where one hand may be replaced by a prosthetic device, the tip of the prosthetic hook may be utilized to operate a shift key if the key is wrapped or covered with foam rubber to allow greater friction on contact. Where skills with business machines such as the typewriter and keypunch are being developed, care must be taken to make individual adjustments for comfort and ease of learning. The adjustments sought are in keeping with a basic philosophy that such modifications should be of a type easily duplicated in the home or office environments. If adjustments are too complex, they may not lend themselves to practical implementation in the field.

Legless students have learned to control foot pedals of dictating machines by placing the control on their seats and shifting body position to alter pressure against the control switch with their hips. In other instances where the leg length is shorter due to disability, items available in the work environment may be made to serve as a platform to elevate the foot switches. It is to be stressed that the simplest type of improvisation, one which may be easily accomplished in any similar work environment, is the adjustment which will be of most value from the point of view of the student.

Where other types of adjustments, more complex in nature, are required, it is in most cases possible to devise them. If such adjustments are not easily movable, their value is limited. Some adjustments require the skills of a design machinist, or carpenter to plan and execute the design in metal or wood. Such small projects are undertaken at Human Resources School to meet specific needs. To illustrate, one student with inadequate arm strength could manage to elevate his hands to strike the keys of a typewriter by using his small finger extended rigidly as a supporting member (against the frame of the typewriter). This was extremely fatiguing and the solution required the skills of a machinist to fashion a supportive device made of metal.

The counsel of the physical therapist or occupational therapist is frequently sought for problems of a highly individualistic nature. The result is a prescriptive approach toward overcoming difficulties which impede learning. Further expansion of this kind of approach is needed. More must be done to capitalize on the untapped promises of evolving technologies. Many presently unsolvable personal problems associated with improving mobility and manual dexterity will yield to the application of new knowledge. Attention to development of this area of service for the physically disabled child will greatly broaden his ability to manipulate equipment or machinery and enable him to learn and work in such environments as business offices, the science laboratory, and home economic classes where there is a greater need for improved physical mobility and manual dexterity.

Visits to schools in California, Michigan and Florida have reinforced previous observations at Human Resources School that many physically disabled students often must continue in school beyond the usual graduation ages of seventeen or eighteen. The need for a more meaningful curriculum, perhaps on the order of a work-study program, is also conceded. Unless older students are unusually able intellectually, they tend to drop out of the secondary programs.

A form of pre-vocational training has been instituted at Human Resources School referred to as the Work Experience Program. Some students do not plan to go on to more advanced studies. By providing them with some work experience during the last year or two of high school they may more readily make the transition from school to work. The student receives credit toward graduation while in the vocational training program. Students in the Work Experience Program are assigned to various departments of Abilities, Inc. or the Human Resources research facility. The types of jobs available involve clerical work, assembly, banking, data processing, library work, glass engraving, maintenance, and electronics work. Additional job categories are being considered. One of the major contributions which work experience at Abilities provides for the physically disabled is the opportunity to work in an environment where other disabled people, from assemblers to executives, have demonstrated their ability to be gainfully employed. This allows the physically disabled child to reassess his potential and to establish his possible future role in life.

There has been a long tradition of work-study programs in the field of business education. The guidelines for such programs have been well established. There must be careful selection and supervision of students. The school coordinator follows up each individual and periodically conducts group discussions with students in the program to determine how they are progressing. There are periodic evaluations of the relationships between the worker, his supervisors, and other employees. The function of the coordinator and the school is to assure that the Work Experience program is providing the student with a learning experience and not merely a part time job. Particularly valuable as a guideline to establishing this type of program are the ten program components which have been developed by the commission for Handicapped Children of the State of Illinois (1960).

SPECIAL SUBJECTS

A. Art Curriculum. The art curriculum at the Human Resources School can be categorized into four areas: Fine Arts Studio; Design and Advertising Art; Art History and Appreciation; and the College Entrance Program. While some overlap exists among these areas, they are by definition separate.

1) College Oriented Program: An art curriculum has been developed that will provide the background required for admission to most colleges. It begins at the junior high school level where the student experiments with a variety of media, such as block printing, soft ground printing, water base and plastic base painting, soft and scrap sculpture, perspective, lettering practice, product design, fashion design, art appreciation, and at least one exposure to community and urban design.

In the three years of high school study, the student in the college oriented curriculum can select one to three art units toward graduation. If the student selects only one such unit, that unit will be in art history and appreciation. The art history-appreciation course meets once a week for an hour with an hour of assigned outside research or practicum in Art. If the college oriented student selects more than one art unit toward graduation he will take the appreciation course and can choose one or two more art courses from electives, such as fashion design, mechanical drawing, advertising art and propoganda, a fine arts studio course, and a course in photography.

If the college oriented student plans to continue his education as a college art major, he must select a three unit major. He may, for example, select the fine arts studios and a two unit minor in art. The recent University of the State of New York publication, The Humanities, (1966) has provided direction for greater involvement of the Arts in the academic curriculum. Implementation of this curriculum was undertaken at Human Resources School on the junior high school level. The student in this art humanities program participates in a five part involvement: an Art Philosophy lecture and art studio experience, a music lecture and studio experience, a literature and drama experience, a library research experience, and a practicum experience in either art, music, literature or drama. The program covers man's cultural heritage from the primitive cave period to the present day.

2) Design and Commercial Art: A general design and

commercial art curriculum is provided for the non-college bound. The student graduating from this course of study could elect to enter a technical art program. Students could also be employed in the field of design and commercial art upon graduation.

A unique feature of this curriculum is its emphasis on preparation for home employment in the fields of design and commercial art. Many of the students taking this curriculum are so physically disabled that the architectural barriers of the existent industries and advertising agencies would preclude their employment outside of the home. Therefore, one aspect of this curriculum deals with patent protections, piece work, mail contracts, artist representative, and direct mail business.

The student in the design-commercial program takes appropriate academic high school subjects but with greater electives in the art skills area. He may graduate with a background in a variety of commercial design subjects, such as fashion design and product design. A product re-design unit is done in the art curriculum to encourage the student to be dissatisfied with existent products. This is approached from the point of view of a physically handicapped individual. Emphasis is placed upon the student's ability to use this training gainfully after he completes his schooling.

In the implementation of this curriculum several problems became apparent. The employment opportunities available and appropriate for these students must be identified. Since the design and commercial art field has become highly technical, specialized and complex, it was difficult to find a faculty member who could teach all of these specialized skills. The problem was reasonably solved by a team approach: a social science teacher in the school was used to teach photography, a draftsman to teach mechanical drawing, and the school's Laboratory for Everyday Living was called upon to provide costume and apparel subjects.

3) Art History and Appreciation: Previously homebound children had suffered from cultural deprivation because of architectural barriers existing in many museums and concert halls. In order to overcome this, an art history and appreciation curriculum was established to stimulate interest and provide enrichment in the arts. The art faculty devotes instructional time to a series of lectures and field trips to local art galleries, artist studios, and the art museums of New York City.

Other aspects of this art enrichment program are the school's Sculpture Court and garden and the "Artist of the Month" series. The artists represented in this collection are of international reputation. In the artist of the month series, a nationally known artist and his work are brought each month to the school. The school has begun to increase this instructional adjunct by starting a permanent collection of paintings and graphics. Items of sculpture and paintings displayed about school develop further interest and inquiry among the students.

4) Fine Arts Program: A broad program of fine arts is provided for all grade levels. The fine art curriculum in the elementary grades follows the philosophy of Viktor Lowenfeld expressed in Creative and Mental Growth (1957). The child is encouraged to develop and enrich his own schema of self. This is especially important in dealing with the disabled. Figure 4 illustrates a group of Human Resources elementary school children fingerpainting.

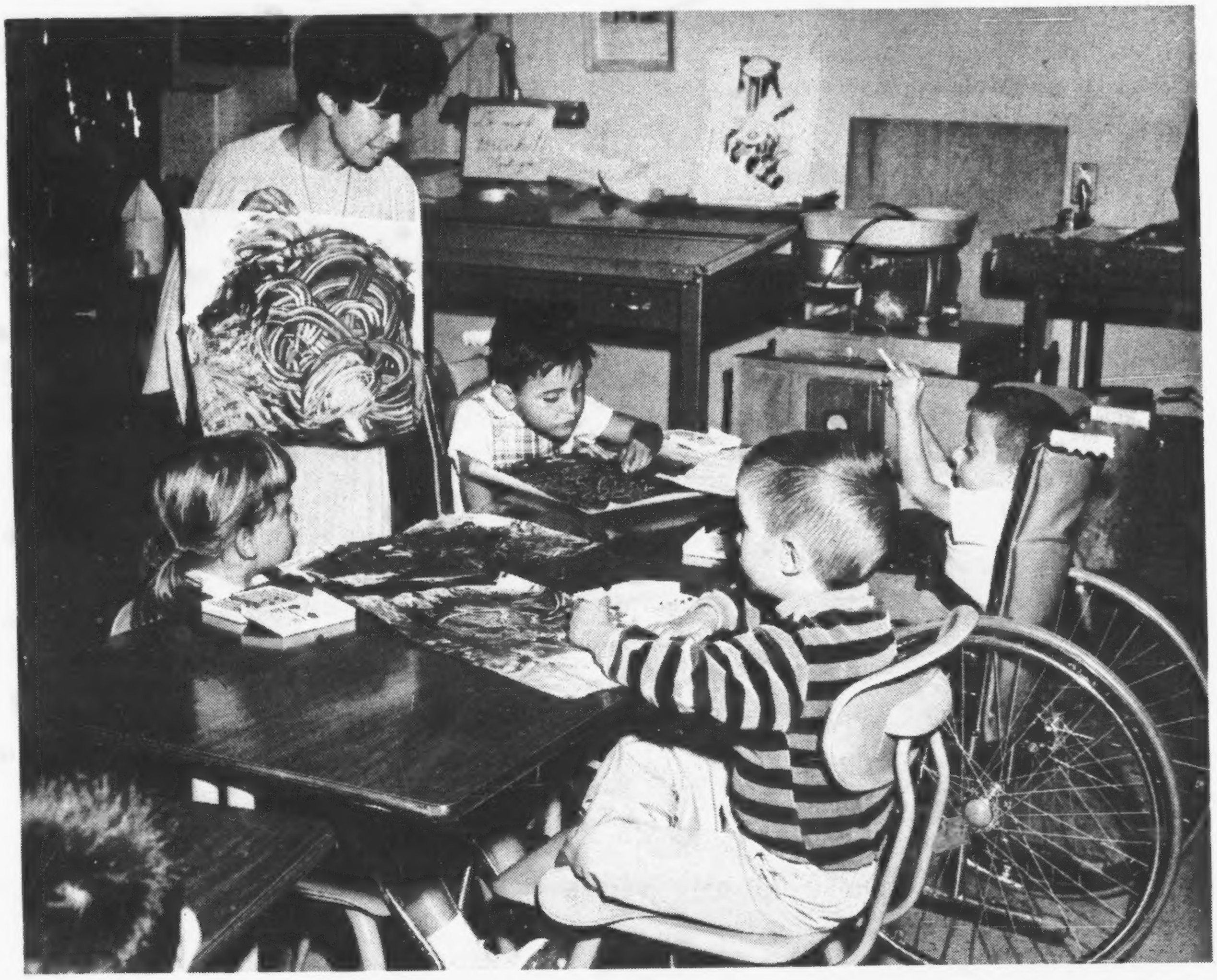

FIG. 4. Elementary school children fingerpainting.

Although the program is not designed to be physically therapeutic, physical benefits exist for the student. This is true whether it be clay work for hand strength, block cutting for arm mobility, or stabile weaving for motor control and coordination. Much is done in the elementary art program to stimulate the tactile and visual sensory apparatus of the student.

B. Photography. The photography class represents an elective area of high interest for students. While the recreational aspects of this program are of great value, the emphasis is on building work skills which will form a suitable base for further technical training. The techniques of photography as an art form and the skills required in processing and enlarging photographs are stressed.

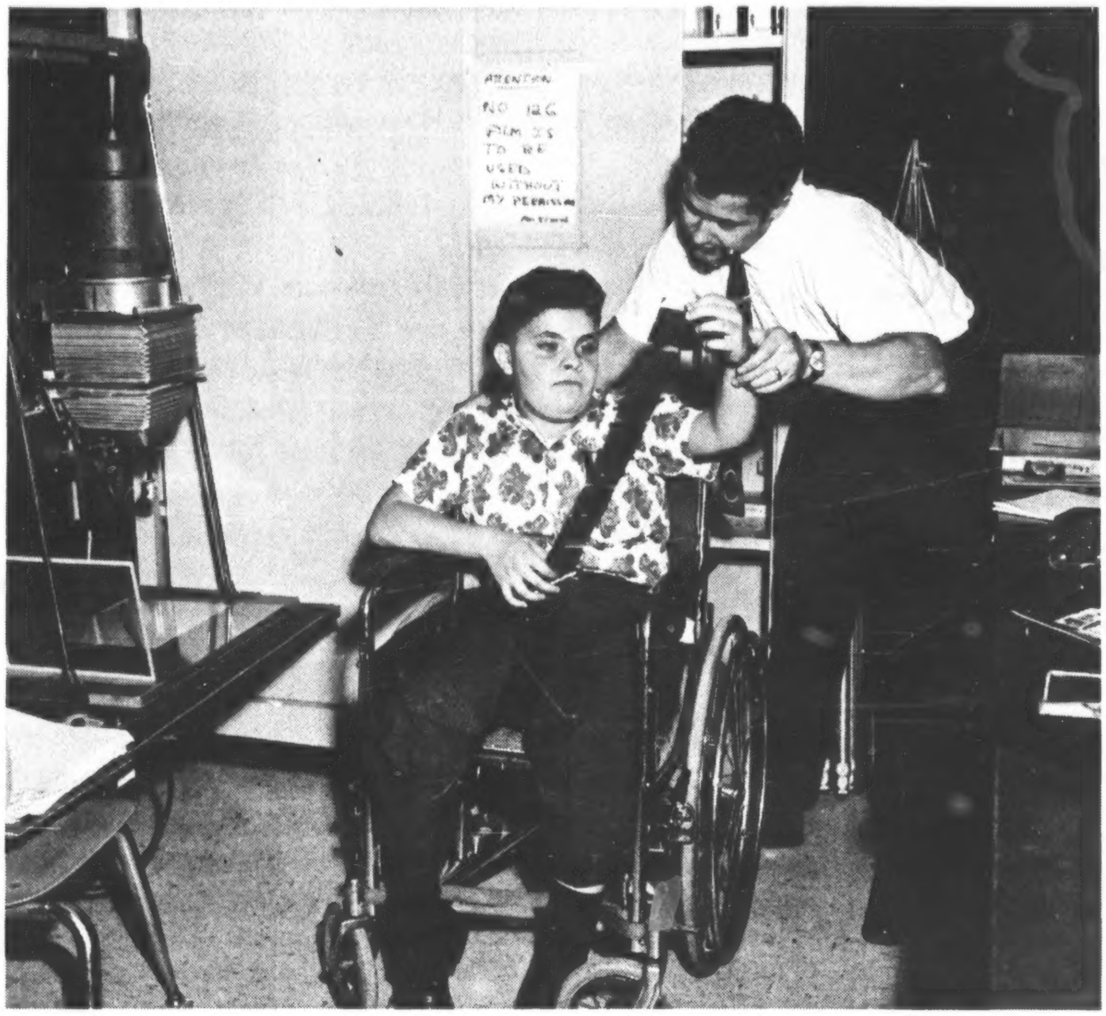

FIG. 5. Student and teacher processing film in photo laboratory.

Considerable modification of equipment has made dark room work and skill in photographic techniques easier to master. The enlarger has been situated so that it is accessible from all sides, four different types of roll film developing tanks are utilized to accommodate specific pupil needs, five different kinds of cameras are available for use, tripods are available for each camera, and work tables and basins have been built at accessible heights for use by physically disabled students. Figure 5 shows student and teacher working in photo laboratory.

C. Puppetry. Throughout the elementary grades the use of puppets in dramatic play provides a means of expression for children with limited use of lower limbs. The fifth and sixth grade classes have been given the opportunity of developing this activity with the help

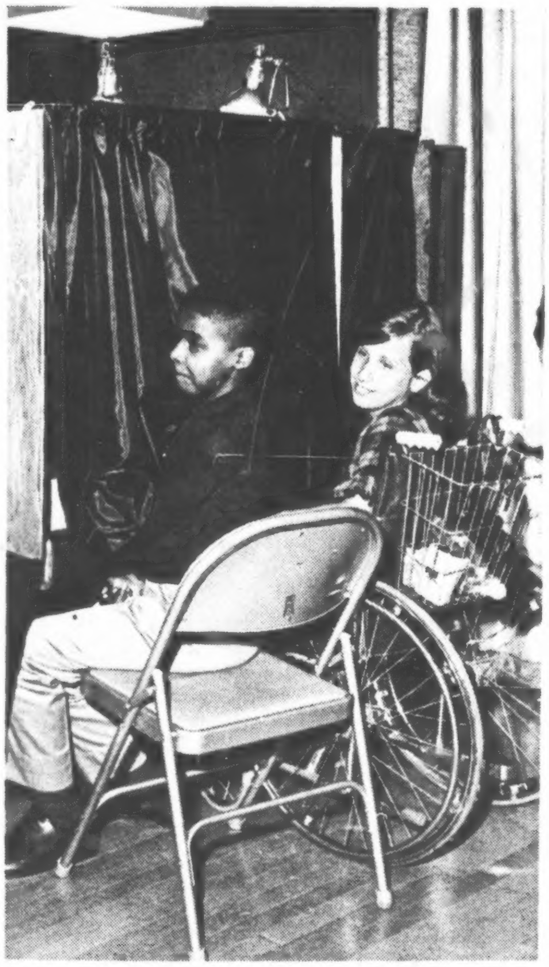

FIG. 6. Children presenting puppet program for parents and classmates.

of a professional puppeteer. The children each create a hand puppet of their own design, under the guidance of the puppeteer and with the assistance of their teacher, the art teacher, and Teacher Aides. After the puppets have been made, the children write plays, developing the characters of the puppets they have created, and making use of their language skills. Throughout the activity, the students are encouraged to improvise and are taught visualization of character, projection, and theatre discipline. Finger and hand movements are practiced in order to facilitate manipulation of the puppets. During the final stages of the activity a show is developed using taped music, simple scenery, and a real puppet stage. The children perform this show for their parents and other guests as a culmination of the entire activity. Figure 6 shows children presenting a program for parents and classmates.

D. Music. In an article describing the music program for a group of disabled children at the Rutland Center of the Vermont Association for Crippled Children, Mrs. Elizabeth P. Allen has stated that a music program adapted to the needs of the disabled can help the children socially by enabling them to relate to each other in creative group work (Allen, 1955). As they learn to contribute their own ideas and combine them with the ideas of others, they develop self confidence as well as respect for the suggestions of others. Through a program of ear-training and recreational listening, children become aware of the fun, enjoyment, and comfort of listening to music. Through their work with rhythm instruments and musical games children can be helped to strengthen their sense of position and direction in relation to their own arms and legs and the space around them (Allen, 1955).

At the Human Resources School the music curriculum is divided into an elementary and a secondary program. Grades one through four are taught by a music teacher experienced in working with young children. The program is based on the concept that music should be a lively, meaningful experience. Traditional and innovative approaches are used. Songs and rhythmic patterns are improvised and rhythm instruments are played which enable the students to feel and hear different types of musical sounds and rhythms.

Musical games have been devised to stimulate interest. Singing stories, singing commercials, action songs, current events, and personal experiences are all utilized. The children sing their names in tune and participate in team contests in song. Sounds are explored constantly. Very often the children listen with eyes closed to promote total concentration. Among the standard musical concepts which are taught are notation, conducting, dynamics and appreciation of the various styles of the composers.

One of the musical events of the year is the presentation of the annual musical show. The students help create original stories and lyrics and do their own staging, which often involves considerable action. Actors move in wheelchairs and stars perform with the aid of crutches and braces. This project involves integration and cooperation with the regular classroom teachers and with the art and dramatic programs. Music is presented in a warm and enthusiastic manner and the children learn to make it an integral part of their lives.

In grades five through twelve the music program is taught by a high school music teacher. Emphasis has been placed on choral singing, since most of the children have had little or no background in musical education before coming to the Human Resources School. Musical concepts have been developed through the presentation of musical literature from different periods. The students are given the opportunity of performing in chorus at many school events.

As part of the music program, assembly programs have been presented to stimulate musical interest. Professional musical groups perform for the students and local school glee clubs also visit.

E. School Library Curriculum. The library program of the Human Resources School was developed in the belief that a school library is indispensible to the total academic progress of its students, and that one of the serious disadvantages of a home instructional program is the absence of professional reading guidance and the lack of diversified library materials. The aims of the school library program are the encouragement of reading, the provision of diversified and current learning materials in all academic areas, and the teaching of efficient independent library usage by the students. The special nature of the student population has led to certain adaptations in this program.

An Interest Inventory given the children in 1964 indicated that their reading and leisure time interests were very similar to those of their able-bodied peers (Velleman, 1964). The book collection has been developed to conform to these findings. Because of the severe academic deprivation of our older students in the early school years and the perceptual difficulties exhibited by those in the primary grades (Barsch, 1967), a large percentage of the student population suffer reading retardation on all grade levels. For this reason, many high interest/low vocabulary books have been purchased using such bibliographic tools as Gateways to Readable Books by Ruth Strang (4th Ed., 1966), Patterns in Reading by Jean Roos (1961), Books for Slow Readers by Marshall S. Hiskey (1967), Good Reading for Poor Readers by George Spache (1968), and books from the Garrard, and Follet, Benefic, and Harr-Wagner presses.

Books about the disabled are purchased only when they are of high literary merit and when they tell about the accomplishments of outstanding figures, such as Helen Keller or Franklin D. Roosevelt. An expanded reference section and a larger ratio of fiction to non-fiction than in the average school makes it possible to supply much of the students' leisure reading material and compensate for the lower usage of public libraries. For this purpose, paperback books have proven to be extremely important; they are inexpensive, lightweight and easily handled by students with upper extremity weakness.

Resources have been developed in audio-visual materials, including film strips, film loops, recordings on disc and tape and art slides and transparencies, all of which are centrally catalogued in the school library. Vertical files include conventional school materials as well as studies done on household activities for the disabled homemaker. Career materials and college catalogs stress those areas and schools which are suited, architecturally and programatically, to the disabled, (Tucker, 1964). The standard school periodical collection is supplemented by magazines in the field of rehabilitation such as Rehabilitation Literature, Journal of Rehabilitation, Rehabilitation Record, and Exceptional Children. The professional book collection includes important works in physical rehabilitation, special education, and learning disabilities.

The students' book collection, except for a picture book corner, is not divided between the elementary and secondary schools because the range of ability on any given grade level is extremely broad, in some cases spanning third through twelfth grade reading comprehension. The combined book collection enables all the students to progress at their own rates, avoiding a feeling of inadequacy in those who must work well below their chronological age groups. This lack of segregation by reading level could have positive effects in many libraries.

In order to serve the needs of a school with a kindergarten through twelfth grade curriculum, and with a population of students exhibiting broad variabilities of educational background, the library program is flexible and offers a highly individualized service in reading guidance. Students from kindergarten through sixth grade visit the library once a week for a story telling session. This activity is important for all children, particularly for those students on the upper elementary levels who do not have the reading ability to handle books which feed their interests. Figure 7 shows a group of children at a story telling session.

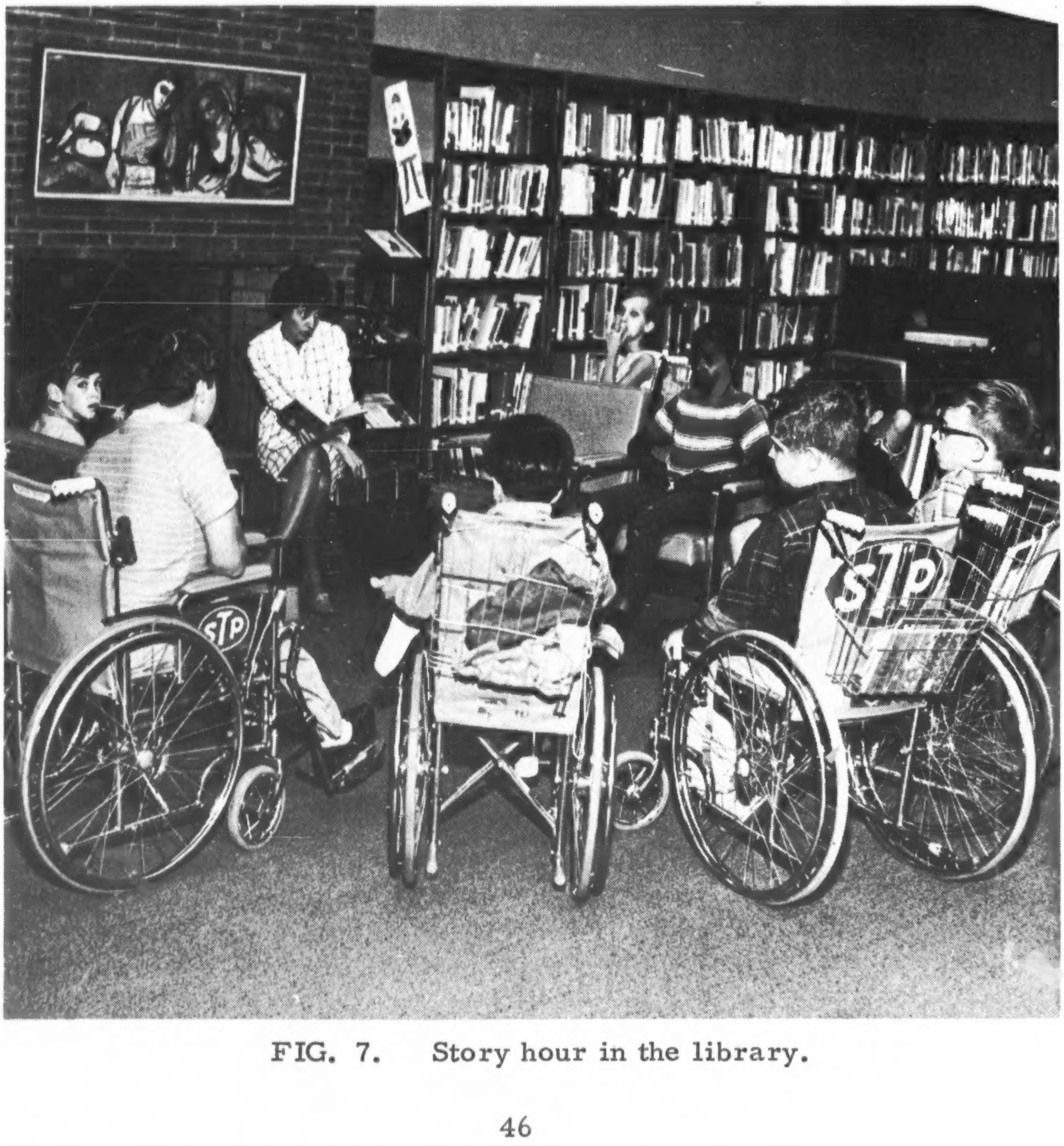

FIG. 7. Story hour in the library.

When instruction is given in the use of the library, it has been found that children respond most favorably in a one-to-one relationship. A librarian who is able to maintain such a relationship with each child is able to accomplish more than a person with a more formal approach.

On the secondary level the use of the library is extremely flexible. Group instruction on the use of reference materials is offered at either the seventh or eighth grade level, depending on the reading accomplishments of the groups involved. High school students use the library during special class periods, free periods, and at lunch time. The librarian endeavors to give individual reading guidance to all students. This requires knowledge of individual reading levels and special interests.

The responsibility of the library program is to encourage and assist the student in his use of public library facilities whenever possible. The architectural availability of specific libraries is made known to the students. Good use has been made of the "direct access" system in Nassau County which enables students to use any other member library when their own library is architecturally inaccessible.

An important aspect of the library program is curriculum work with the school staff. The staff must be provided with current materials in the various academic areas; they must be apprised of new findings in special education. The knowledge of community resources and services available to the disabled is required, and a file of field trips with information as to architectural availability is maintained.

The school library plays a constructive role in preparing students for their academic careers, assisting students to realize vocational goals, as well as broadening their environmental horizons through reading.

F. Physical Education. Traditionally the orientation toward physical education for the physically disabled has been to provide exercise of a remedial nature, or to provide activities which reinforce physical therapy.

In schools where there are both physically normal and physically disabled, the needs of the disabled child have been ignored. Often he has simply been excused from "gym." At other places he has been

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encouraged to watch the other children. In some schools special programs have been set up involving games such as shuffleboard or ping pong. There are indications that this philosophy is being modified. Greater emphasis is being placed upon physical education for its recreational or play value and its competitive appeal. The olympic games held for paraplegics in Israel and Tokyo provide a dramatic illustration of this trend.

At Human Resources School this attitude is carried one step further. There is an attempt to provide for the physically disabled child a well rounded and "normal" physical education program. Since the fear of injury to the child on the part of parents, administration, and teachers seems to act as a deterrent and restricts the range of physical education activities which may be programmed, one of the major contributions of the adapted physical education program at Human Resources School has been to show that these fears are largely unwarranted. Contact sports, such as touch football and soccer, may be safely adapted for the physically disabled child and still retain the interest, fun, and physiological benefits that exercise in these sports does provide. In the five years that this program has been in existence there has been no serious injury or effect detrimental to the health of the participants. These results may be attributed to careful planning; and frequent consultation among medical authorities, the physical education instructor, and a physical therapist. The school's Medical Director provides the structure of the program based upon his evaluation of the disabilities of each child. Another factor contributing to the success of the program is the skillful supervision of activities by the instructor of physical education. The provision of careful evaluation and skillful leadership in the program of activities cannot be overemphasized. The outcome is a successful program which provides a new dimension in education for the physically disabled child.

All of the children in grades one through twelve in the Human Resources School participate in the physical education program, even though approximately 75 per cent of the school population are confined to wheelchairs. This factor was the major consideration in adapting activities. Because of the severe limitation in the use of upper extremities resulting from such disabilities as Muscular Dystrophy, the adaptation of physical education to meet the needs of these children has been difficult to accomplish. The motorized wheelchair alleviates the problem by compensating for some of the physical disadvantages, expanding possibilities for participation in such activities as dodge ball, wheelchair basketball, wheelchair hockey and relay racing. Figure 8 illustrates a group playing wheelchair hockey.

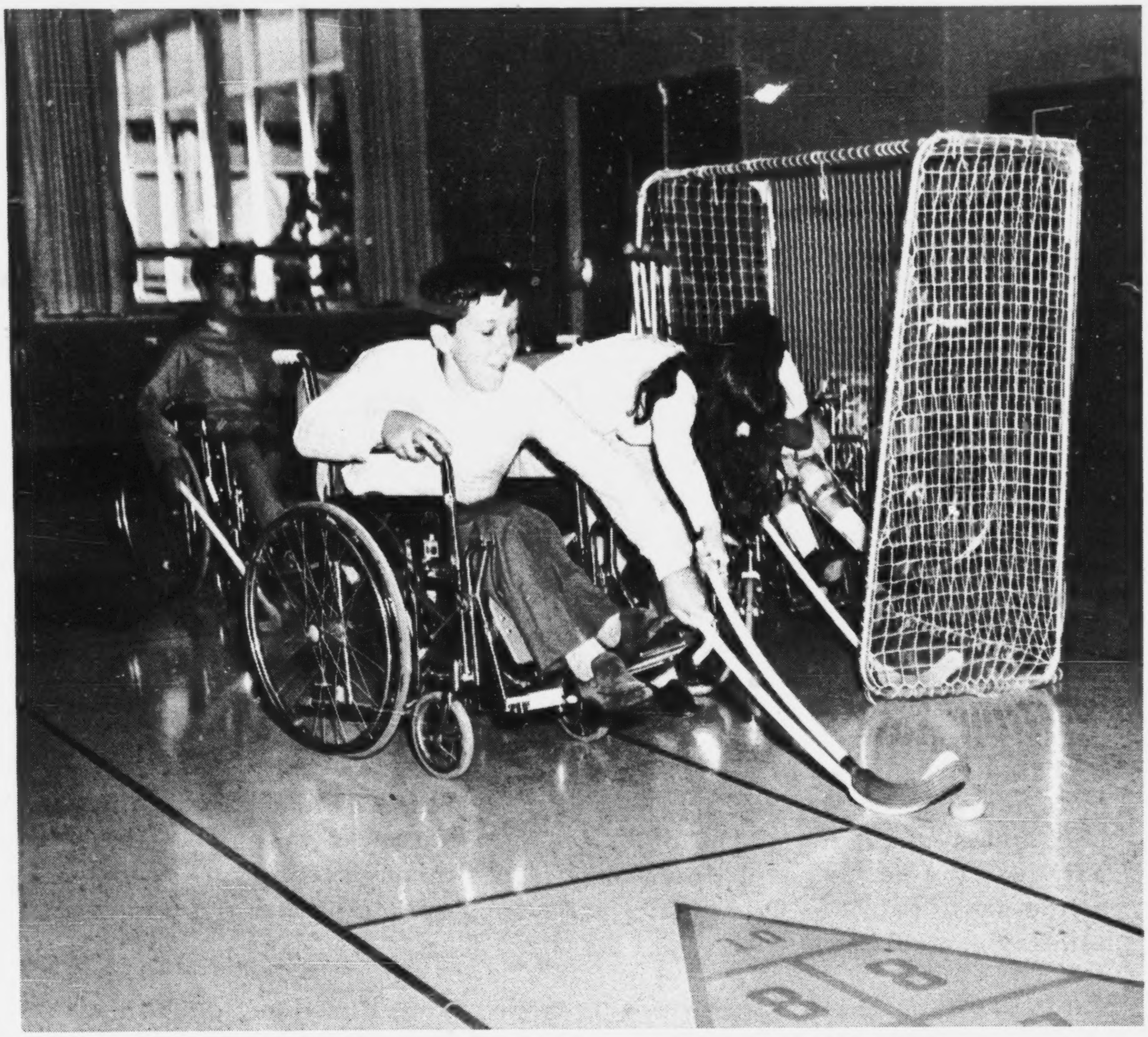

FIG. 8. Children playing wheelchair hockey in the Human Resources School gymnasium.

Another adaptation for severely disabled students is the lightweight bow in archery. In weight training, where pulleys, weights, and other equipment is utilized to exercise the arms and upper body, lighter weights are used. Disabled students find fencing difficult, but if students are carefully matched they are eager and able to compete. Wheelchair students remain stationary during the fencing matches. Ambulatory students observe regular fencing rules.

In bowling a special portable ramp developed at Human Resources Research & Training Institute is utilized. The student positions the ramp which will direct the ball toward the pins. The ball is placed on top of the ramp, with assistance if necessary. The student then pushes the ball down the ramp and onto the alley. Some students in wheelchairs bowl without the assistance of a ramp. Lawn Bowling or Bocci is played outdoors. This activity requires no modification since the lightweight balls are easily lifted and rolled.

Touch football illustrates how, by careful matching of opposing teams and by adaptation of the game to the needs of the participants, the fun and physical benefits of a popular sport may be provided for the physically disabled child. The activity is started by pairing students according to disability. One student goes out as a pass receiver, and the other as his defender, with each student alternating as receiver and defender. Eventually two teams are formed. One team goes out for pass receiving and the other team defends. Yardage for each team accrues at each successful pass completion. After three downs, the teams may change from offense to defense. Regular goals may be set up and six points is scored for a touchdown. Classmates take turns pushing the chairs of those students unable to push their own.

The goal of volleyball, to prevent the return of a ball over the net by an opposing team, is modified for physically disabled students who find it difficult to return a ball over the net. The net is lowered and each team is divided into two squads. Each squad is stationed on both sides of the net. The objective now becomes that of getting the ball over the net as many times as possible through team work by squads of the same teams. Other net games such as badminton and tennis are similarly modified.

Wheelchair Soccer requires little modification. Students unable to use their legs may use the foot-pedals on the wheelchair as a method of giving impetus to the soccer ball. In Wheelchair Basketball the recognized rules for the game are followed (National Wheelchair Basketball Association, 1968). Students with upper limb weakness are limited to catching and throwing the ball.

Softball is played on an outdoor field. The usual rules are followed and this sport need not be adapted with the exception of the use of classmates as helpers in pushing wheelchairs to bases when necessary.

A special miniature golf course has been constructed. The success and satisfaction that resulted from this experiment has encouraged additional construction. Students also participate in active group games such as dodge ball, relay racing, and tag. Modifications of these games are made as needed. There is intramural competition in table tennis, checkers, shuffleboard, bowling, archery, and nok-hockey. Class winners receive gold medals and go on to compete for the school championships. As a result of the intramural program students are requesting meets with other schools. Plans are being made to invite teams from local schools to compete in such activities as wheelchair basketball, wheelchair softball, swimming, chess and nok-hockey.

Swimming in the heated pool at the Center is a weekly feature of the physical education program. The pool is constructed to provide easy access for all individuals with disabilities.

Student teachers and other observers of this program, as well as workers in physical education programs for physically disabled children (Steele, 1966), have indicated that one of the major benefits of such programs for the physically disabled child is the development of self-confidence and better adjustment to his individual handicaps. After quoting such authorities as Kessler, Wallin, Barner, Wright, and Gonick, Daniels (1965) concluded that the emotional problems of a disabled individual may act as a greater handicap to personal development than the physical factors. The Human Resources School physical education program allows students to demonstrate with reasonable guidance what they can do, and realistically assists them in setting their own limitations. This allows the disabled student both to accept his limitations and to discover new levels of performance.

G. Health Education. Health education is the school nurse's responsibility in the Human Resources School. Instruction is continuous throughout the K-12 program. Personal instruction on problems of hygiene to meet the particular needs of an individual is given as needed. For example, the incontinent child must often receive special instruction on the importance of personal cleanliness.

In the elementary program dental hygiene is stressed. The techniques of proper dental care are presented and the role of the school dentist is explained. The school nurse also emphasizes the necessity of adhering faithfully to the program of exercises and swimming suggested by the physical therapist and school physician. Part of the nurse's task is to supervise students who should be using crutches. The students are often tempted to use the wheelchair even when they are capable of ambulation. Teachers cooperate with the nurse in this task.

The secondary school program involves such activities as the discussion of the care of eyes and ears, discussion of health practices that are preventative in nature (e. g. remaining on toileting schedule, avoidance of decubitus, the understanding of the menstrual cycle and related problems). At other times the school nurse enriches the science program by assisting in the demonstration of tests for color blindness, the methods used infirst aid, and, when a team approach is used, teaches topics concerning the personal health problems of the disabled child.

The school nurse and school physician have periodically collaborated to present lectures to some of our teenage students concerning sex education, but as yet there is no formal program of sex education.

There is a need for a planned program of safety education, since many hazards are faced by the disabled child which are unique to his condition. A curriculum of instruction in safety procedures should be developed and implemented.

Also greatly needed is a program of counseling for parents of disabled children. The program for parents could be extended to include group therapy by the school psychologist.

H. Home Economics and Activities for Daily Living. The home economics curriculum for physically disabled students must be modified to assist them in facing a world filled with architectural and mechanical barriers. At Human Resources School the approach to home economics skills includes an evaluation of each student's capabilities and limitations. The student's capabilities may be developed by the instruction of proper techniques and the use of equipment. The student's special interests are important in curriculum planning. While all students need instruction in labor and time saving techniques, those who are interested in advanced sewing or gourmet cooking should be given an opportunity to develop skills and knowledge in these areas.

The typical student attending Human Resources School has a particular lack of experience in the home economics area. Because of architectural barriers, many are not familiar with their own kitchens and household equipment. Consequently, basic concepts such as measuring and pouring, as well as practice with everyday appliances, cannot be assumed as common knowledge. For this reason, home economics is introduced at the elementary level with opportunities for experience and the development of simple skills. The teaching of nutrition and food preparation makes the student aware of possible labor and time saving techniques and products. For example, a double amputee might learn that slicing vegetables utilizing a special gadget is possible, but also that packaged pre-sliced vegetables are available.

Sewing units include information about the possible adaptations of machinery and basic concepts of apparel design for the physically disabled.

The teaching of home economics and of Activities of Daily Living are integrated. How to make a bed from a wheelchair also includes the selection of sheets which permit ease of use, how to raise a standard bed to the level of a wheelchair with simple wooden blocks, and how to get in and out of a bed independently. For many disabled students, energy expenditure is an important consideration. The cardiac child learns that a dish drain eliminates the need to dry dishes; that one or two shelves carefully arranged can save energy by eliminating bending and reaching for items frequently used in household activities.

As in staffing any small school servicing a grade span of preschool through twelfth grade, the home economics teacher must be a flexible individual skilled in teaching all grade levels and varying curriculum areas. The staff member must also be willing to incorporate new techniques and devices in the program.

The original concept of the home economics program involved a team approach, combining the state program of study and a plan aimed at assisting the disabled student in leading an independent life. It was conceived as an interdisciplinary program involving the medical and ancillary medical staff and the home economics teacher. For example, a parent-school nurse-teacher conference might reveal that a child was not functioning as independently as expected at home. The school nurse, teacher, and home economics teacher might then work out a program of study for the individual child within the program. However, as the school population grew, the ideal had to give way to a unit class plan. Also, as originally conceived, courses were to be offered to small groups of students sharing common disability problems. For example, it was thought that upper extremity amputees should be taught sewing together because they shared common problems in the operation of equipment and techniques of handling the material. Due to the small number of students in each group this was often not feasible.

I. Guidance and the Curriculum. Guidance classes are held weekly for the junior and senior students at Human Resources School. A full time guidance counselor is employed and is responsible for the instructional program in guidance, as well as for the other traditional functions.

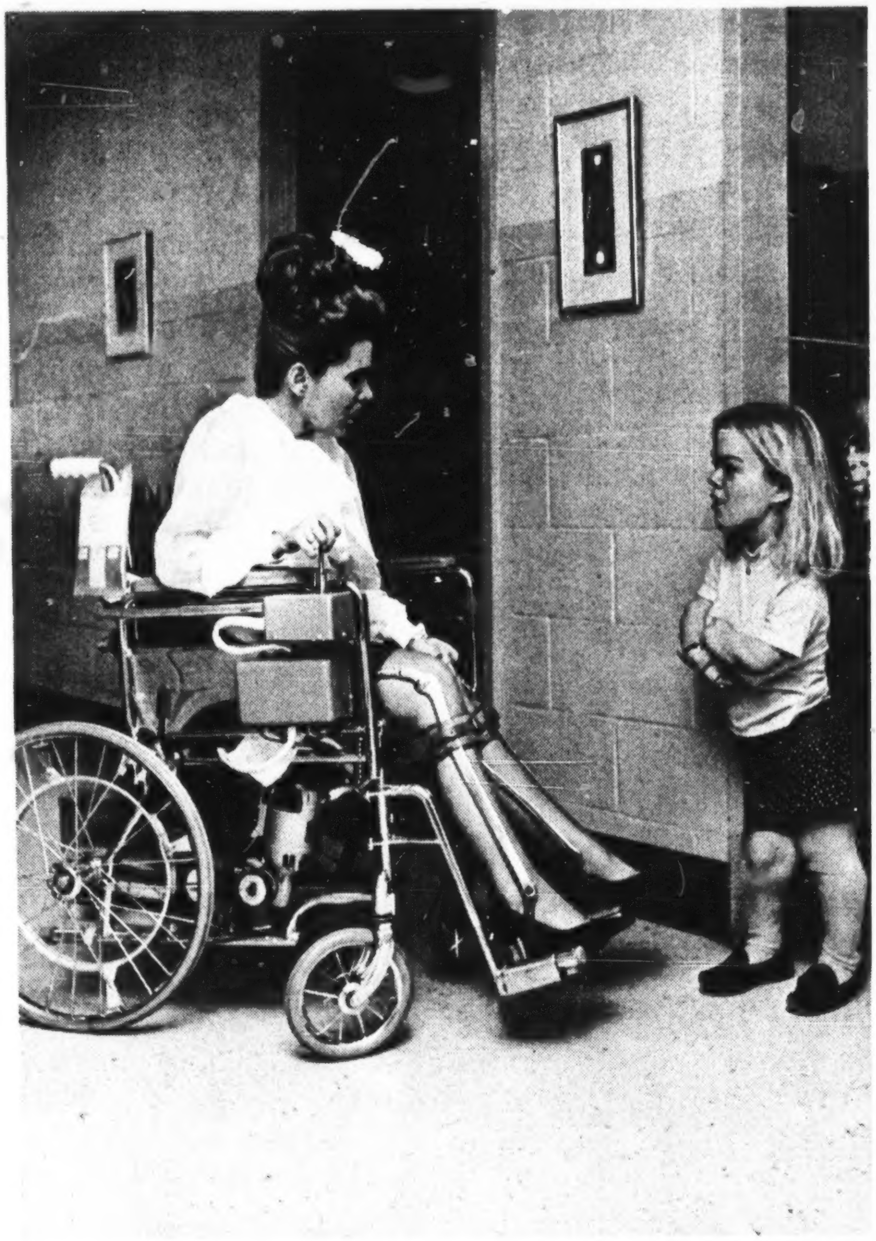

FIG. 9. Student and guidance counselor chat informally in the hallway.

Guidance classes meet for a full period of 45 minutes. The New York State suggested syllabus is used as a basic outline for the course work, but the fundamental aim of each session is to provide an open, non-directive approach where each individual feels free to discuss any topic. Films, speakers, and field trips are planned as an outcome of guidance sessions. Figure 9 illustrates an informal counseling session.

The following list is representative of the topics of interest which are important to disabled students.

1) What are college requirements?
2) How may I obtain funds for schooling?
3) Where may I obtain a job?
4) Will I be able to obtain an aide to assist me in college work?
5) How do I find out about my interests and aptitudes?
6) What kind of jobs are available?
7) What agencies are available to help?
8) Which college campuses are adapted?

One of the major objectives of a guidance program is to develop awareness of self, self acceptance, and an attitude of self confidence and poise. One of the major concerns, exhibited by the frequency of discussion in guidance classes, is how to behave and respond when other people look at you as a disabled person.

Where there is the possibility that a student may be able to enter the regular public schools, the guidance counselor assists in this transition. The student is given the opportunity of a trial period in his local school and a transfer is made.

EXTRA CURRICULAR ACTIVITIES

Student Council, the school yearbook, the school newspaper, inter-school events involving the glee club, intra-school sports and academic games, an evening seminar program and evening recreational activities planned by students are a few of the extra-curricular activities conducted at Human Resources School.

It has been a frequent complaint of the physically disabled child that social and recreational activities are insufficient. There is little social interaction with friends after school, with the exception of some older children who begin to use the telephone for conversing with school friends. The need for socializing has been met to some degree by the evening recreation program. This program provides an afternoon and evening of recreational activities such as games, dramatics, swimming, and competitive sports events. In addition, an innovative program was implemented; a series of evening seminars on topics of importance and of current interest to secondary school students was developed. Students from the ninth through twelfth years are invited to participate. The meetings are held once a month throughout the school year from 4:30 to 7:30 pm on Fridays, with a break for supper at 5:30 or 6:00 pm. Groups of parents take turns preparing supper in the school cafeteria each month. After the meal, the group returns to the school library. Instructors recognize that many important academic and social skills can be transmitted in a less formal environment than that of the classroom.

The programs use speakers (professors of sociology and psychology), films, and demonstrations of social interaction utilized to illustrate some of the principles of group dynamics and communication theory. Actors are hired to present excerpts from contemporary plays illustrating problems of alientation and the generation gap. The videotape recorder is utilized and at one session differences in group reactions to a given problem are demonstrated. These activities launch rather prolonged and deep discussions. Prior to the meeting of each seminar the two teachers conducting the program prepare readings taken from appropriate literature. This material is copied and presented to seminar members one week in advance of the meetings. The science laboratory is utilized for behavioral studies of animals. A few of the topics discussed during the seminar sessions are: Man as a Social Animal, Man as a Materialist, Communications and Man, Man and his Ecology, Man and Self, Man as a Political Animal. Informal evaluation is constantly being conducted, and it is noted that many students seem to gain personal insight as well as an understanding of the needs of others. The only formal evaluation of the program is a questionnaire submitted at the end of the last session.

A. Field Trips. Some of the major events of Human Resources School may be termed co-curricular rather than extra curricular. They are the field trips, trips protracted beyond the range of the usual trips that are completed within one school day. Extended field trips have been taken to Mystic, Conn. and to Sturbridge, Mass. Careful planning has made these trips outstandingly successful educational experiences for the physically disabled child involved. The trip leader visits the site prior to the trip, surveying such details as accessibility of toilet facilities to wheelchair students. The school nurse accompanies the group on each trip, and teenagers from the nearby Herricks High School accompany the group to assist in pushing wheelchairs. The groups stay at the site one or two nights, providing two or three full days for sightseeing. These trips are very worthwhile. The children gain a unique social and personal experience. Many have never slept away from home or functioned completely independent of parental supervision.

B. Driver Education. Human Resources School provides a program of driver training for its students and other disabled students. Figure 10 shows a student about to enter a driver training vehicle.

New York State requires that students be at least 16 years of age to enroll in this program and have passed a written examination concerning traffic regulations and safety. Before the issuance of a learner's permit, the examiner checks each disabled child for evidence of manual dexterity and a range of head and arm motion which would allow the child to become a safe driver. Forty-eight hours of instruction, plus examination time, over a 30 day period, is provided. The full requirements for driver education are described in the 1968 Administrative Handbook on Summer Secondary Schools. While a driver training program for disabled children is not unique, the nature of the student body presents unique problems. The types of learning experience derived from this program have not been adequately evaluated in the discussions of some well known programs (see Reynolds, 1967;

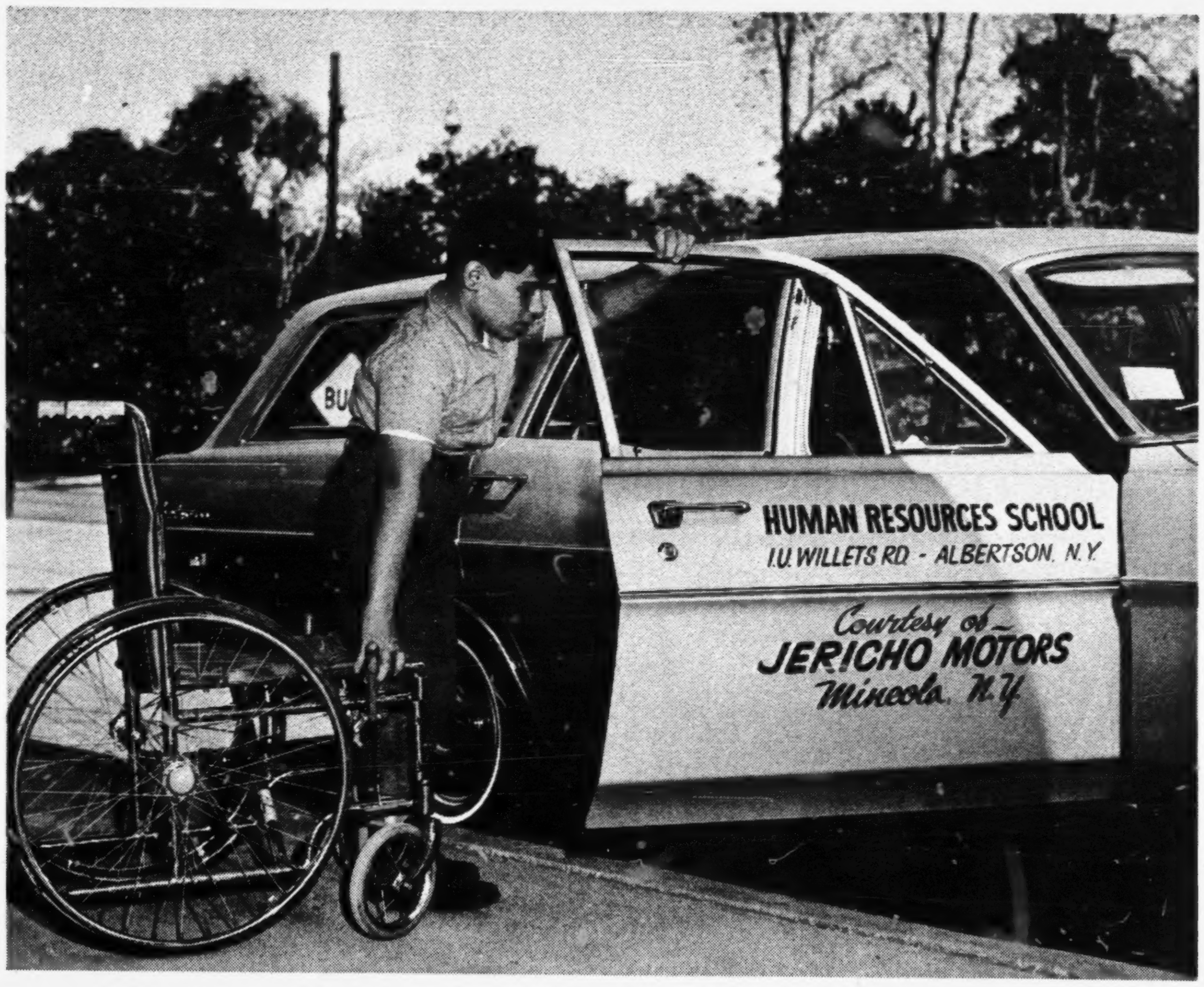
HUMAN RESOURCES SCHOOL
I.U. WILLETS RD - ALBERTSON, N.Y.
Courtesy of
JERICHO MOTORS
Mineola, N.Y.

FIG. 10. Student about to enter driver training vehicle.

Henderson & Kole, 1965).

The problems faced with the training of the first group at Human Resources School were formidable. One student was permanently encased in a body cast (Osteogenesis Imperfecta) and two others were dwarfs (Achondroplasia) with short arm reach and weak musculature. Other disabilities were Friedrichs Ataxia, Paraplegia (Spina Bifida & Post Traumatic), and Quadraporesis (Post Polio). Six of the eight students accrued enough practice time to take the New York State driver's test. Five of the six students passed the exam and achieved their licenses. The sixth failed to observe a stop sign and was automatically disqualified.

The usual New York State driver's exam requires 10 to 15 minutes. Due to the concern of the examiners, a large block of time was made available for the testing of this group. Each student was put through an extremely thorough 30 minute examination.

Experiential and other environmental factors other than physical disability often present obstacles to learning driving as far as the physically disabled child is concerned. Many parents exhibit a negative attitude toward the idea of driver education for their disabled child. Many refuse to adapt the family car in order to provide the additional practice necessary between class sessions. These children do not gain the increase in skill and confidence that normally accompanies additional practice. It seems that homebound students generally have less familiarity with a motor vehicle than would be expected. Instructors noted that more time was required for students to get the "feel of the road," to learn about a car's handling characteristics, and to become familiar with instrumentation. Instructors would choose long, isolated, one way service roads to begin with, in order to familiarize students with car handling and the driving sensation. These observations indicate a need for greater alertness on the part of any instructor planning to teach driver education to the physically disabled child.

One of the major criticisms of the program concerned the lack of time allotted for the course. Normally, there are four student members in a car, for one hour of driving practice. Each student receives approximately 15 minutes of practice time behind the wheel. The time for practice on an hour's run is much less per disabled student because:

1) Some students must be strapped into position behind the wheel of the car and this requires considerable time.

2) Some students (achondroplasia) with weak muscles required having the hand taped to the gas control level to enable proper control. Students with this category of disability were required to stand on the driver's seat while controlling the vehicle. Additional bracing with straps was also required.

3) Many students with deformed backs had to take time to arrange and re-arrange foam pillows behind the backs and under their seats in order to arrive at proper driving posture. The standard triangular car pillows were used for this purpose. Some students required three or four pillows for comfort and proper height or posture.

4) Paraplegic students require more time to shift from the

rear seats to the driver's position up front.

One instructor has estimated that because of these factors the actual practice time was cut to about one half of the normal time. It is recommended that the present number of practice hours be doubled to compensate for this loss of practice time. Studies by Bernoff (1958) and Bishop (1963) conclude that 12 hours of instruction in driver trainer simulators could be substituted for three of the standard six hours of behind the wheel experience usually required in training courses. No significant variation in test performance was found when this was done. A sufficient number of drivotrainer simulators for mass instruction may provide a partial solution. A report by the President and Fellows of Harvard College, the Harvard School of Public Health study (1963) reported that a control group of non-disabled drivers had about twice as many accidents and violations as did the experimental group of disabled drivers.

The teachers in this training situation should be sensitive and sympathetic. The pupil-teacher relationship in the driver training program is often more intimate and the learning environment more informal, thus promoting greater familiarity between students and instructors. It was observed that the physically disabled child is rather easily discouraged in his first attempts and must receive constant support from his instructor. Henderson and Kole (1965) also stress this same point. In reference to the program conducted by the Institute of Rehabilitation Medicine they state, "Patients were taught principles of safe driving from an instructor with much driver experience and with a sensitivity to the special fears and needs of the disabled."

The students exhibited much esprit de corp and identified with each driver. All students actively concentrated and cooperated in trying to devise solutions to the particular problems each individual had to overcome in order to drive. Learning to drive seemed to be a crucial experience in their lives, for the ability to drive provides accessibility to social and school activities. In terms of future employment, the ability to drive is essentially a pre-vocational skill.

The usual mechanical aids, such as a spinner disc on the steering wheel, manual controls, and extension blocks on control pedals were utilized. Air conditioning in the driver training vehicle is desirable during hot summer weather since perspiring hands on the steering wheel often slip. Instructors have indicated that vehicle design for the disabled driver is an area that needs particular attention. A rather comprehensive listing of devices and aids needed for driver training of the disabled has been compiled by Henderson and Kole (1965).

SUMMARY AND IMPLICATIONS FOR FUTURE CURRICULAR CHANGE

It has not been demonstrated that the intellectual ability of physically disabled children varies from that of the total school population. There is a paucity of data regarding cognitive and affective characteristics of physically disabled children, and some of the findings seem contradictory.

Foremost as an aim in the education of the physically disabled child is the development of latent resources, intellectual, social, and physical. Some special requirements in the education of the physically disabled child are the need for additional school time and an enriched curricula. Additional consideration must be given to aspects of instructional techniques, such as testing and the assignment of class and homework. Teacher aides are necessary adjuncts in the education of the physically disabled child. It is important to select teachers and ancillary personnel who are versatile, mature, and understanding individuals.

The pre-school program should provide each child with a background of educational experience to compensate for experiential deprivation and to prevent future learning problems.

The elementary program should be broadly based in subject areas, and should emphasize integration of knowledge in subject areas and foster development of emotional and social maturity.

The secondary curriculum for the physically disabled child should parallel traditional patterns of subject materials and instruction to a great degree. This is particularly true of those areas of learning which rely heavily upon the lecture-discussion approach. Modifications in curricula and instructional techniques are most prevalent in such areas as home economics, science laboratory, and physical education. The secondary curriculum should provide special courses of a pre-vocational nature for the physically disabled child, and a full program of driver education.

Human Resources School is gravitating toward an interdisciplinary approach to curriculum implementation. This is evidenced by the fusing of some course content into problem centered programs, such as the seminar program and the humanities oriented art program. These patterns of instruction utilize aspects of team teaching and the core approach.

It is the contention of the administration at Human Resources School that one of the major problems of providing a secondary program for the physically disabled child is economic. One estimate puts the cost of education for a physically disabled child at two to four times as much as would be required to educate the child in a regular public school (Moss, 1966). Thus, in addition to providing a good program of education, one of the constant tasks of administration is to develop more economic schemes for implementing the educational program. For these and other reasons, experimentation in curricula to meet both objectives is being encouraged.

Human Resources School has been in operation for five years, and has by all traditional parameters of success demonstrated that the intellectually capable physically disabled child may be educated in a pattern synchronous with, if not superior to, his non-disabled peer. The children have achieved a high degree of success with State exams and CEEB exams and they have obtained admittance to colleges and universities.

One of the most difficult problems of planning curricula is the inability to predict what the future adult requirements of the physically disabled child might be in a rapidly evolving technological society. Snygg (1963) refers to this problem in his discussion of "A Learning Theory for Curricula Change." New approaches to curriculum organization have to be considered, for we are educating now for an unpredictable future. Gilchrist and Snygg (1965) suggest that new curricula be planned around the aspect of cognitive organization, and use the work of Festinger (1957) to support the contention that we must assist the student to behave and perceive in such a way as to increase organization and decrease the dissonance in his perceptual field. Developing a positive self-image, self sufficiency and independence must receive greater consideration in the formulation of curricula for the physically disabled child.

It has been suggested that the students be taken out of the school periodically in order to use the public transportation facilities as a realistic laboratory, and to attempt to develop the techniques, skills, and adaptations necessary to go from one place to another. Educators have also stressed the importance of field trips which involve an overnight stay at some distance away from home as a necessary learning experience.

A fifth year program on the secondary level has also been suggested. Such a year of additional education might be spent exploring vocational possibilities firsthand. The specific suggestion is to allow the student to experience a full work day or several work days on a trial basis, to be followed by a day of seminar activity which would include an evaluation of the student as he relates to fellow workers and his superiors. This year of learning through direct experience would also include activities to expand the social and cultural life of the physically disabled student. The best placement of such a year would be between the traditional 11th and 12th year of the secondary curriculum. The implementation of such a program within a secondary school would be an important innovation in the education of the physically disabled child.

Field trips in a home economics program would include housing projects, homes in areas designed for the disabled, decorating houses, clothing manufacturers, food producers and manufacturers, and mass feeding facilities. In addition, the home economics curriculum can be enriched by a speaker and visiting specialist program. Guest teachers could, for instance, include gourmet cooks, experts in clothing design, and home decorators. A home economics program can include a greater integration of audio-visual material as a means of enrichment. Specialists in the various home economics areas are available through E. T. V.

In planning for the expansion of the home economics program, emphasis should be placed on an interdisciplinary approach. For example, home economics and art, as they become jointly involved in fashion and apparel design (especially the adaption of clothing for the disabled), would seem to be naturally linked. Other disciplines to be involved would include: Science in the teaching of the chemistry of food and how synthetic fabrics are produced; social studies in the approach to the problems of food production, population, agriculture, and food customs; industrial arts and the constructional program in repair of small appliances, and home repair and maintenance; the school nurse teacher in the enrichment of home nursing and child care program.

A home economics program could include a home economics house. During their senior high school years students would be required to spend a specific length of time living in the facility. Under the guidance of faculty members they would be responsible for working together in planning meals and maintaining the home. The purpose of such a facility would be the preparation of students for college, careers, and an independent life.

With reference to student utilization of the school library, new developments in the areas of micro-reproduction and electronic information retrieval offer far-reaching possibilities for the disabled (Toffler, 1964). Future library plans can include television transmission of visual information from the library to instructional areas and environmental carrels wired for sound and vision.

Many academic areas can use computer assisted instruction. An analysis of the results of computer assisted instruction at the end of the third year of the Accelerated Program in Elementary School Mathematics being conducted at the Institute for Mathematical Studies in the Social Sciences at Stanford, California, seems to indicate that their student groups did better on some of the standard mathematics tests than did their peers (Suppes, 1967). These CAI experiments seem to indicate that the use of computers will allow each student to learn more material more effectively, and at the student's own appropriate pace of learning. Hopefully, these same results may apply to a physically disabled population; in any case, this possibility should be explored.

The need for parent counseling is a pressing requirement. A comparison of similar schools indicates that individual and group counseling among parents and staff has often been tried, usually in separate groups. Success in these counseling sessions has varied from "good" to "disastrous."

There are some important concepts and practices which seem to constantly force themselves on all personnel working with the physically disabled child. One is the need for time to learn. The physically disabled child cannot be rushed. If he must parallel the traditional track of learning at the same pace as the normal child requires, the machinery of learning usually breaks down. Some recent evidence regarding individual differences in rates of learning tends to support these observations. Briggs (1968) discusses this problem with great clarity, but reminds us that we may not rely upon the easy expedient of merely allowing the learner to set his own pace.

Another important concept to consider is that in some areas of education the physically disabled child must have highly specific adaptations made to his needs. Conversely, in subject areas that rely heavily upon a lecture-discussion approach, major modifications do not seem necessary. The teacher of the physically disabled child must be constantly alert for special needs and must be able to adjust his method to the many requirements for learning progress. One cannot generalize about the specific requirements; they are highly individual and must be determined by each child and his disability.

Another important factor is the great need for emotional and social development. Personality becomes withdrawn or warped without interaction with other children. Teachers at Human Resources School have observed a high degree of social immaturity and withdrawal in many children disabled from birth. Those children who are disabled in later childhood find it difficult to continue their normal range of social activities and must be encouraged. It is particularly gratifying to observe the progress which some older quadraplegics make in terms of socialization after they experience a few years of school life. Children who did not talk or exhibit emotions by facial expression begin to relate to others by speaking and smiling. The observable improvement raises some interesting questions. Perhaps there is some critical age at which the physically disabled child should enter school in order to prevent further deterioration of personality. It may be crucial to establish priorities in order to determine the proper order of educational, social, vocational, or physical rehabilitation.

Throughout the school experiences of the disabled an attempt must be made to develop in him the greatest possible degree of psychological and physical independence. Only constant attention to these factors will enable him to begin to achieve economic self-sufficiency and personal fulfillment.

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APPENDIX

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